

**PERSISTENCE OF CULTURABLE ANTIBIOTIC RESISTANT
FECAL COLIFORMS IN MANURE AMENDED VEGETABLE
FIELDS**

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ABSTRACT

The reduced efficacy of antibiotics in treating common infections is one of the most pressing health concerns of the 21st Century. Increasing evidence links the widespread use of antibiotics in livestock production to the transfer of bacteria carrying antibiotic resistance genes to the broader environment. It is therefore critical to understand the persistence and dissemination of resistance in agricultural soils to understand potential threats to consumers. The goal of this large-scale agricultural field experiment was to identify the effects of crop (lettuce, radish) and fertilizer type (inorganic, compost, raw manure) on the incidence and persistence of antibiotic-resistant fecal coliforms, a common family of fecal indicator bacteria used to track the environmental spread of antibiotic resistance. Soil samples were collected eight times over a 120-day period and analyzed for fecal coliforms utilizing a suite of MacConkey agars supplemented with different antibiotics (ceftazidime, clindamycin, erythromycin, sulfamethoxazole, and tetracycline). Given the number of samples with resistant fecal coliform concentrations below the limit of detection, analyses to identify the effects of soil treatment and crop relied on Zero-inflated Poisson Regressions. Antibiotic-resistant culturable fecal coliforms were recoverable from soils across all treatments immediately following application, though persistence throughout the experiment varied by antibiotic. Sulfamethoxazole- and tetracycline-resistant fecal coliforms were nondetectable after Day 1; this was expected, as the cattle supplying the manure amendments were not treated with these antibiotics or similar analogs. Clindamycin- and erythromycin-resistant fecal coliforms were nondetectable after 42 days but rebounded on Day 90 in the soil; both of these drugs were of the same antibiotic class as the ones used to treat the dairy cattle during the manure collection period. Ceftazidime-resistant fecal coliform levels were consistently high throughout the duration of the growing season. No statistical differences were observed between root and aboveground crops. Results suggest that soils amended with raw or composted dairy manure are at risk of contamination with antibiotic resistant fecal coliforms; however, composting decreased the antibiotic resistant fecal coliform levels of the macrolide (erythromycin) and lincosamide (clindamycin) antibiotic classes administered to the dairy cattle (cephapirin and pirlimycin).

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GENERAL AUDIENCE ABSTRACT

The reduced efficacy of antibiotics in treating common infections is one of the most pressing health concerns of the 21st Century. Increasing evidence links the widespread use of antibiotics in livestock production to the transfer of bacteria carrying antibiotic resistance genes to the broader environment. It is therefore critical to understand the persistence and dissemination of resistance in agricultural soils to understand potential threats to consumers. The goal of this large-scale agricultural field experiment was to identify the effects of crop (lettuce, radish) and fertilizer type (inorganic, compost, raw manure) on the incidence and persistence of antibiotic-resistant fecal coliforms, a common family of fecal indicator bacteria used to track the environmental spread of antibiotic resistance. Over the course of 120 days, samples were collected from field plots to identify if there were antibiotic-resistant bacteria (ARBs) in the soil. This study was partially motivated as a means to evaluate the Federal Drug Administration's Food Modernization Safety Act updated manure treatment guidelines in decreasing potential pathogenic bacteria in soils used to grow vegetables for human consumption. Antibiotic-resistant bacteria were recoverable from soils across all fertilizer types immediately following application, though persistence throughout the experiment varied by antibiotic tested. From the above findings, compost amended soils had greater quantities of total and ceftazidime-resistant bacteria. However, composting did show a significant decrease in the antibiotic-resistant bacteria levels found in the same antibiotic classes, macrolides and lincosamides, that the dairy cattle were treated with at the beginning of this study.

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1. PROJECT OVERVIEW AND RESEARCH QUESTIONS

Antibiotic resistance poses a global challenge to human and animal health, given the heavy reliance on these drugs to treat common infections caused by bacteria. Resistance can occur through natural selection as bacteria develop strategies to combat antibiotics through genetic mutation and then transfer these genes hereditarily (Davies and Davies, 2010), or it can be acquired through the horizontal transfer of antibiotic resistance genes (ARG) between cells (Aminov and Mackie, 2007). Therefore, even if non-pathogenic, antibiotic-resistant bacteria (ARB) are a concern as their corresponding ARGs may be transferred to other active bacteria, including human pathogens.

Soil, one of the most diverse microbial habitats on Earth, serves as an environmental reservoir for ARBs (Forsberg et al., 2012). Once the resistant organisms are present in the soil, the possibility of resistant gene transfer and the development of ARBs can become a health concern, given the potential for human exposure through environmental pathways (Burch et al., 2015; Finley et al., 2013).

A significant portion of ARB loading to the environment is associated with livestock production. In 2014, nearly 100% of the more than 15 Mg of antimicrobials approved for use were administered in animals to enhance food production (US-FDA, 2014). Livestock are often treated sub-therapeutically with antibiotics to prevent disease and increase growth efficiency (Sura et al., 2015). Of the antibiotics ingested, 40-90% are excreted through the animals' feces and urine (Arikan et al., 2008); therefore, it is not surprising that ARBs have been recovered from agricultural soils fertilized with dairy manure (Marti et al., 2014; Udikovic-Kolic et al., 2014; Williams-Nyguen et al., 2016).

Livestock manure requires additional treatment prior to application to agricultural soils used to grow produce for human consumption. Additional treatments, such as composting, effectively reduce fecal indicator organisms and bacterial pathogens, while rendering nutrients more immediately plant available. However, the effect of composting on antibiotic-resistant bacteria and genes has yet to be fully understood (Sharma et al., 2009).

A fundamental step in understanding environmental dissemination of antibiotic resistance is to focus on the agricultural sources associated with antibiotic use in

livestock, and to track the movement of ARBs from “farm to fork”. If ARBs do persist within the agricultural system, they could pose a risk to consumers. Identification of practices within the agricultural production system most likely to increase risk of exposure will enable managers to establish the best practices to prevent the spread of resistance at these critical control points. The most recent US Food and Drug (FDA) Food Safety Modernization Act (FSMA) provides guidelines to limit the spread of pathogens in agriculture including acceptable manure treatment processes to reduce quantities of specified pathogens before agricultural application (FDA, 2015). The overarching goal of this study was to examine the persistence and fate of ARBs in soils amended with raw manure (worst case scenario) and compost produced in accordance with these FSMA guidelines. Specific research questions include:

1. Does the addition of antibiotic-treated manure and compost alter antibiotic resistant fecal coliform levels in soil relative to antibiotic-free treated compost?
2. How long do antibiotic resistant fecal coliforms persist in soil following amendment with compost or manure? Are patterns of persistence different between antibiotic classes?
3. Does the type of vegetable grown in soil alter antibiotic resistant fecal coliform levels in the soil relative to vegetable-free soil?

2. ANTIBIOTIC RESISTANCE BACTERIA IN AGRICULTURE: A LITERATURE REVIEW

Antibiotics represent one the greatest advances in modern medicine and public health. However, some infectious bacteria can survive exposure to antibiotics, broadly termed resistance (Davies and Davies, 2010). Antibiotic resistance is an escalating human health concern, as it renders infections more difficult to treat. Resistance increases infectious mortality, extends hospital stays, increases costs associated with alternative treatment, and results in the loss of workplace productivity (de Kraker et al., 2011). The World Health Organization's (WHO) first global report on antimicrobial resistance states that up to 54% of common bacteria species associated with nosocomial infections have demonstrated resistance to one or more antibiotics (WHO, 2014). Given that the use of antibiotics to treat bacterial infections has decreased mortality rates from common infections by up to 75% (Jayachandran et al., 2010), it is imperative that a holistic approach examining the multiple pathways of antibiotic resistance be carried out to ensure their continued efficacy.

Natural ARB diversity is considerable. It can be assumed that within the world's bacterial populations there exists resistance to all known classes of natural and synthetic antibiotic compounds (D'Costa et al., 2006). Documented ARBs include pathogenic *Shigella*, *Escherichia coli* (*E. coli*), *Pseudomonas*, *Staphylococcus*, and *Salmonella* that cause diseases like dysentery, urinary tract infections, kidney failure, pneumonia, and death (Breidenstein et al., 2011; da Costa et al., 2013; Klevens et al., 2007). It is therefore not surprising that antibiotic resistant infections in humans were observed shortly after the discovery and medical application of penicillin in the 1950s (Agga et al., 2015; Wright and Poinar, 2012). During the past 25 years, there has been a significant increase in infections caused by ARBs (Al-Jassim et al., 2015).

In 2015, the global cost of antibiotic resistance was estimated to be over \$1.5 billion (WHO, 2015). In the US, the Centers for Disease Control and Prevention (CDC) reported that more than 2 million people suffer from antibiotic resistant related infections each year, resulting in an estimated 23,000 premature deaths (USCDC, 2016; USCDC, 2013). The over-prescription of antibiotics and/or failure of patients to adhere to dosing

schedules have long been considered a primary concern (McArthur et al., 2015; Turnidge, 2005); although the impact of potential environmental pathways is increasingly recognized as a critical issue (Finley et al, 2013; Pruden, 2014).

It is unlikely that new antibiotic development alone can reduce the global burden of disease associated with antibiotic resistance. Pharmaceutical research focusing on the development of new antibiotics has decreased largely due to high economic costs (Gandra et al., 2014; Reed et al., 2002). A new antibiotic is estimated to cost up to \$900 million in research and development and may require more than a decade to receive market approval (Monnet, 2005). Antibiotics are generally prescribed over a short course, thus offering pharmaceutical companies a more limited financial gain when compared to the profit margin of life-long use drugs for chronic illnesses (Capita and Alonso-Calleja, 2013; Monnet, 2005). Therefore, the reduction of antibiotic resistance will be a balance between conservation and innovation.

2.1 Antibiotic Resistant Pathways

Antibiotic resistant infections were originally assumed to be overwhelmingly acquired through exposure in clinical settings, i.e. within hospitals or acute care centers (Maragakis et al., 2008). Nosocomial exposure is of serious concern; methicillin-resistant *S. aureus* (MSRA) acquired in clinical settings caused over 94,000 infections and 18,650 deaths in 2005 (Klevens et al., 2007). Patients in clinical settings diagnosed with MRSA are 64% more likely to die than patients with *S. aureus* infections (WHO, 2016). Up to 15% of pneumonia, tuberculosis, and malaria infections are resistant to antibiotics (WHO, 2016).

There is increasing recognition that the potential spread of antibiotic resistance is not restricted to clinical settings (Benveniste and Davies, 1973). Given that resistance is already a survival strategy of naturally-selected soil and water microbial populations, there is concern that anthropogenic activities may stimulate the spread of resistance from naturally-present environmental bacteria to human pathogens (Davies and Davies; 2010, D'Costa et al., 2006; Wright and Poinar, 2012). D'Costa et al. (2006) sampled the

antibiotic resistance by challenging microbial isolates from multiple soils across the world with multiple different antibiotics, and quantified resistance in every strain of bacteria isolated.

Increases in resistance amongst environmental microorganisms have been attributed to the industrial production of antibiotics, as well as from usage in livestock agriculture (Cabello, 2006; de Costa et al., 2013). Davies and Davies (2010) estimate that pharmaceutical companies have released millions of metric tons of antibiotic compounds into the environment. Although actual amounts are difficult to quantify, antibiotic compounds are continuously being introduced to the environment through anthropogenic activities caused by livestock, agriculture, wastewater treatment, hospital care, and industrial pharmaceuticals. While clinically acquired MRSA is at an all-time high, an increased number of MRSA infections have specifically been linked to livestock practices and agriculture in the last 15 years (Verkade and Kluytmans, 2013).

The contamination of water can serve as a means of transporting resistant bacteria throughout environment (Bailey et al., 2015; MacArthur et al., 2015; Sura et al., 2016). Both surface and ground waters can be contaminated by antibiotics, antibiotic resistant bacteria, or antibiotic resistance genes (Vignesh et al., 2013). Coleman et al. (2012) enumerated resistant *E. coli* in drinking water and found it to be directly responsible for the resistant *E. coli* in animals and humans. In the US, less than 10% of all *E. coli* outbreaks are waterborne, suggesting that environmental dissemination of resistance associated with *E. coli* originates elsewhere or is foodborne (LaPara and Burch, 2012; Rangel et al., 2005).

2.2 Antibiotic Usage and Antibiotic Resistant Bacteria in Agriculture

Veterinary antibiotics and metabolites reach the environment directly from animals in pasture, and indirectly as a form of fertilizer used in agriculture (Amarakoon et al., 2016; Boxall et al., 2004; Cessna et al., 2011). Livestock manure is applied as a common substitute for inorganic nitrogen (N) and phosphorous (P) fertilizer to increase soil quality in farming practices worldwide (Evanylo et al., 2008; Marti et al., 2013). In

the United States alone, 90 billion m² of land receive manure application in some form annually (NASS, 2005). Cattle manure amendments are applied to reach the nutritional requirements of crops, and are economically equitable to using commercial fertilizer (Araji et al., 2001). Therefore it is not surprising that every day in the US, up to 6.35 million metric tons of manure are applied to agricultural fields as fertilizer (USDA NASS, 2010); unfortunately, this manure can contain antibiotic residuals, resistant bacteria, and pathogens (Sharma et al., 2009). Determining the movement of *E. coli* and fecal coliforms in agricultural environments is necessary to connect how animal and human pathogenic transmission occurs.

In 2011, nearly 70% of antibiotic sales were for livestock use (FDA, 2012); however, by 2014, nearly 100% of the more than the 15,000 Mt of antimicrobials approved for use were administered to animals to enhance growth efficiency for food production (USDA, 2014). Livestock are generally treated sub-therapeutically with antibiotics to simultaneously prevent herd disease and increase growth (Sura et al., 2015). Beef cattle are primarily given tylosin and chlortetracycline-sulfamethazine, whereas dairy cattle are given cephalixin and pirlimycin (Sharma et al., 2009). Growing evidence links the widespread use of antibiotics in livestock production to the transfer of bacteria carrying antibiotic resistance genes (ARG) to the broader environment via manure amendments to soil (Fahrenfeld et al., 2014; Wichmann et al., 2014; Williams-Nguyen et al., 2016).

Numerous studies have documented the presence of antibiotics and markers of resistance in manure and manure-amended soils. A meta-analysis by Kumar et al. (2005) reported that antibiotic concentrations in manure ranged on average from 1 to 10 mg kg⁻¹. Not surprisingly, these levels can stimulate resistance in manure and soil microorganisms. A recent study in Canada examining the fate of ARBs in the soils of a vegetable field fertilized with manure from antibiotic-treated livestock recovered 10⁴- 10⁷ more resistant gene copies per gram of soil as compared to soils amended with a non-antibiotic supplemented control manure (Marti et al., 2014). Similarly, a study conducted in Connecticut, US reported higher concentrations of total β -lactam-resistant bacteria in soils amended with dairy manure compared to soil treated with inorganic fertilizer (Udikovic-Kolic et al., 2014). Interestingly, this study also indicated through genetic

analyses that the manure amendments induced colony growth of antibiotic resistant bacteria independent of the known antibiotics which were given to the cattle (Udikovic-Kolic et al., 2014).

Quantifying resistance within complex systems can be challenging. A recent review by Williams-Nyguyen et al. (2016) states that antibiotic resistance in agricultural systems is dependent on multiple factors, including soil type and temperature, and that measurements can be strongly influenced by quantification methods. Aga et al. (2016) identified growth media as a critical factor in quantifying antibiotic resistance levels, and also noted that antibiotic concentration, stability, and accumulation impact the final resistance bacteria levels observed. Antibiotics react differently in the environment; therefore, it is critical to study the matrix effects, bioavailability, toxicities, and multiple concentration levels of each antibiotic being tested for ARBs before quantification (Aga et al., 2016). Daughton (2003) suggests that temporal variation affects the release of contaminants, like antibiotics, into the environment, which emphasizes the need to consider system level factors. Multiple studies suggest that manure containing antibiotics increases overall ARB concentration within soil communities; however, it is often unclear whether this increase is attributable to the growth of naturally-occurring “background” resistant bacteria from the soil community or “new” resistant bacteria introduced by the manure (Jechalke et al., 2013; Udikovic-Kolic et al., 2014). After sulfadiazine-spiked manure amendments to agricultural soils, Heuer and Smalla (2007) quantified ARBs that did not correspond with the spiked antibiotic concentrations, i.e. increases in resistance to other antibiotics were observed, suggesting that that resistance mechanisms might be linked and dependent on environmental reservoirs.

2.3 Composting as a Manure Treatment

Adding nutritional value to agricultural soil by application of treated manure is considered an environmentally sustainable practice, with few human health risks when adherence to specific health and safety guidelines is maintained (Ray et al., 2017). Recently, the FDA Food Safety Modernization Act (FSMA) proposed guidelines for manure treatment processes, including composting, to reduce the number of pathogens to

sufficiently low levels before amendment application to minimize the potential for human exposure (FDA, 2015). Composting can effectively reduce fecal indicator organisms, bacterial pathogens, and between 50-70% of antibiotics (Pruden et al., 2013; Sharma et al., 2009; Wu et al., 2010), while rendering nutrients highly plant available (Larney et al., 2003). Although it is widely assumed that the high temperatures associated with the composting process will inactivate most human pathogens, the results of research regarding antibiotic and antibiotic resistant bacteria degradation during composting are complex. Previous work indicates composting techniques can remove up to 99% of antibiotics from manure; however, removal efficiency is dependent on the particular class of antibiotic targeted and its associated chemical structure; and not all antibiotics have been examined (Arikan et al., 2007; Beahdy, 1974; Dijk and Keuken, 2000; Dolliver et al., 2008), e.g. there are no studies relating to the degradation of cephalosporin (β -lactams) and lincosamide antibiotics in dairy manure composting (Ray et al., 2017). Antibiotic classes of macrolides, sulfonamides, and tetracyclines used in beef manure have been studied in relation to composting degradation. Lincosamide, macrolide, tetracycline, and sulfonamide antibiotics are large, synthetic, and broad, respectively, and are controlled by similar mechanisms (McDermott et al., 2003).

Lincosamides are alkyl derivatives, that do not have a lactone ring (Leclercq and Courvalin, 1991). Through rRNA methylation, a conformational change occurs that targets the ribosome to inhibit protein translation by binding to the 23S rRNA (Alekshun and Levy, 2007). Macrolides are very similar to the mechanism of lincosamides, by means that they bind the large ribosomal subunits (23 rRNA) at the peptidyl transferase center and inhibit cell growth by disrupting protein synthesis (Gaynor and Mankin, 2005; Roberts et al., 1999; Vazquez, 1979). Macrolides are usually comprised of a 14-, 15-, or 16-membered lactone ring along with at least one sugar or like substitution (Gaynor and Mankin, 2005). Macrolides are commonly prescribed to treat Gram-positive bacterial infections, which make them of clinical importance to reduce the possibility of complete antibiotic resistance. Tetracyclines bind with the 16S rRNA to inhibit protein synthesis as well. Sulfonamides target dihydropteroate synthase, which allows for the inhibition of folic acid synthesis (Levy and Marshall, 2004). Although antibiotics have different

mechanism of action, once linkages between resistant bacteria and genes occur it is more likely for bacteria to be resistant to multiple antibiotics (Levy and Marshall, 2004).

Dolliver et al. (2008) found that after composting, spiked turkey litter CTC concentrations decreased more than 99%, but monesin and tylosin concentrations decreased more gradually, and sulfamethazine did not degrade at all. Sharma et al. (2009) observed that while composting does decrease total fecal coliforms and culturable resistant *E. coli* in manure, detectable quantities of *E. coli* were recovered in the compost piles at 18 weeks, contrary to USEPA guidelines (USEPA, 2015). Perhaps of more concern, tetracycline (*tet*) and erythromycin resistance methylase (*erm*) genes remained detectable despite adherence to recommended guidelines (Sharma et al., 2009). The effects of composting on different ARB levels in livestock manure must be quantified in compost amended soils.

2.4 Conclusion

The following study is part of a broader effort (Reducing Antibiotic Resistance from “Farm to Fork” USDA-NIFA award 2014-05280), and specifically aims to determine the effects of adding composted dairy manure to agricultural soils on populations of antibiotic-resistant fecal coliforms in a large-scale field experiment. From a “farm to fork” perspective, antibiotic resistance must be identified and specifically managed throughout agricultural processes. There is a need to quantify ARBs in agricultural soils and to evaluate how compost compares to the use of raw manure with respect to antibiotic resistant fecal coliforms present. Pertaining to the US FDA, the present study examines the persistence and fate of ARBs in soils amended with raw manure (worst case scenario) and compost produced in accordance with these FSMA guidelines. Previous studies have characterized antibiotic, ARB, and ARG movement in agricultural systems with respect to livestock manure (Aga et al., 2016; Marti et al, 2013; Udikovic-Kolic et al., 2014); this work is novel in its holistic approach throughout the food production chain. Specifically, the masters work described here is unique in its consideration of the impact of soil addition of compost and raw manure in parallel on soil ARBs.

3. METHODS AND MATERIALS

Experimental plots were constructed according to an unbalanced system design in order to compare the effects of crop type and manure type on ARB incidence and persistence. Five soil amendment treatments were included: 1) No fertilizer on barren plots (n=3); 2) chemical fertilizer only on lettuce and radish plots (n=6); 3) antibiotic-free compost on lettuce and radish plots (n=6); 4) compost with antibiotics on lettuce and radish plots (n=6); and 5) raw manure with antibiotics on lettuce and radish plots (n=6). The project timeline is given in Table 3.1, and the design, construction, treatment, and planting of the twenty-seven project plots is detailed in subsequent sections.

Table 3.1. Project Timeline

Date	Description
June-August 2015	Herbicide Application & Mowing
October 2015	Plot Installation
December 2015	Lime Application
February 2016	Gutter Installation
March 29, 2016	Day -1: Background Soil Sampling
March 30, 2016	Day 0: Amendment Application Soil Sampling for ARB analysis
April 6, 2016	Day 7: Soil Sampling for ARB analysis
April 27, 2016	Day 28: Vegetable Planting Soil Sampling for ARB analysis
May 12, 2016	Day 42: Soil Sampling for ARB analysis
May 26, 2016	Day 56: Soil Sampling for ARB analysis
June 6, 2016	Day 67: Lettuce Harvesting
June 14, 2016	Day 75: Radish Harvesting
June 29, 2016	Day 90: Soil Sampling for ARB analysis
July 27, 2016	Day 120: Soil Sampling for ARB analysis

3.1 Study Site

Treatment plots were constructed at the Virginia Tech Urban Horticulture Center (UHC) in Blacksburg, Virginia on land that had neither been used for livestock grazing nor treated with manure for over a decade. The underlying soil is categorized as a16B, Remus fine sandy loam. Soil testing conducted at the Virginia Tech Soils Lab reported an initial pre-treatment soil pH of 5.5, buffer index of 6.19, phosphorous concentration of 84 kg/ha, and potassium concentration of 322.5 kg/ha. Plots were surveyed and flagged previous to installation to ensure all 27 plots had the same downward slope to facilitate overland flow drainage (Figure 3.1). Given a regular wind pattern from west to east, manure and compost plots were deliberately placed downwind to minimize potential aerial contamination of inorganic fertilizer and no-amendment controls.

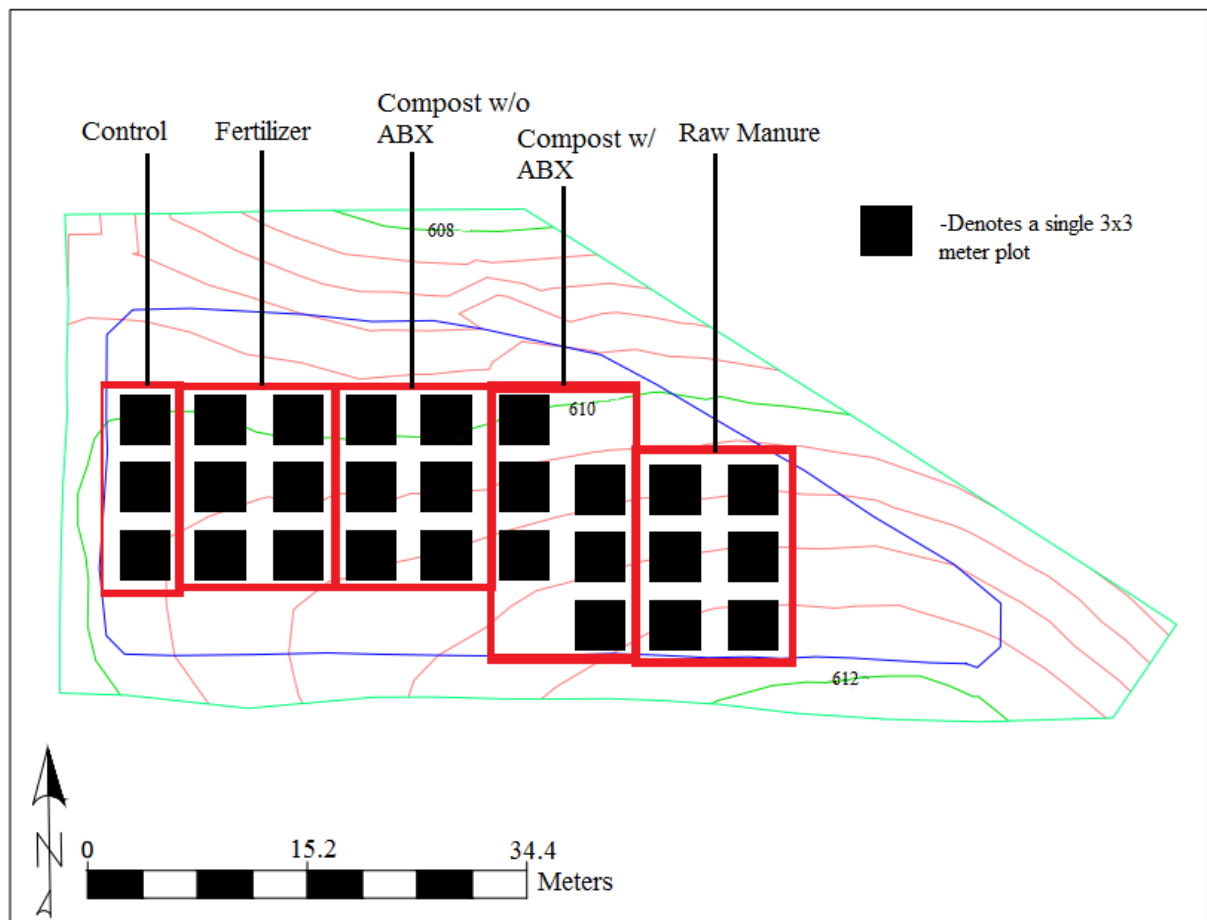


Figure 3.1. Aerial view of field plot locations at Urban Horticulture Center with elevation survey overlay. (Courtesy of K. Jacobs)

3.2 Experimental Set-Up

3.2.1 Plot Construction

Twenty-seven 3 m x 3 m 16-gauge galvanized steel plot borders were manufactured off site, and installed at UHC in late October 2015 (post-tillage). On site three steel borders were riveted and caulked to ensure stability and prevent contamination across plots. Plot borders were inserted 20-cm to extend through the soil B horizon (Fig. 3.2A). Runoff collection systems were installed 10 cm below ground level with a 10° top to bottom slope to ensure proper flow of runoff for immediate collection (Fig. 3.2B).

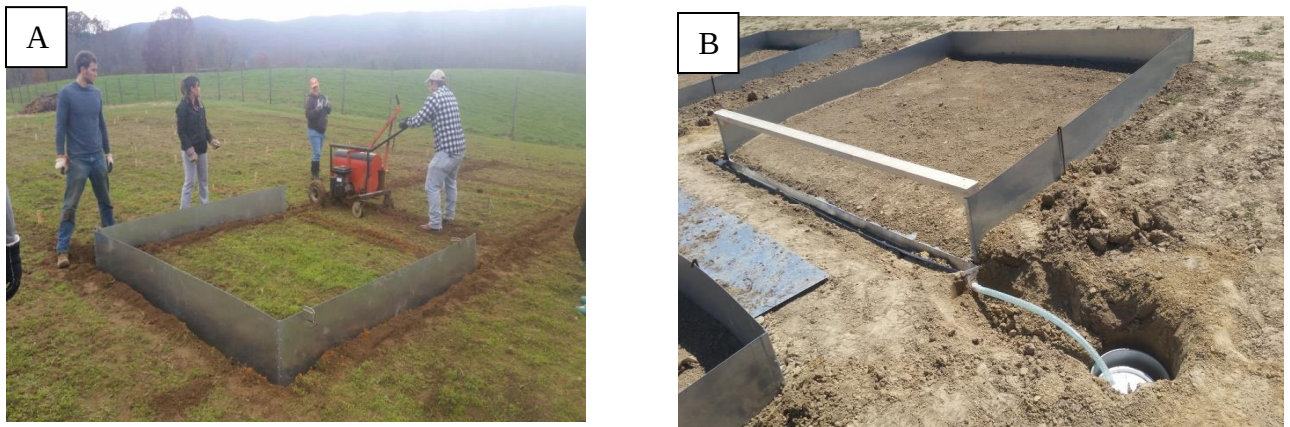


Figure 3.2. A) Plot installation; and B) runoff system installation for plots at the Urban Horticulture Center in Fall 2015 and Spring 2016 respectively.

3.2.2 Manure and Compost Generation

Manure was collected from eighteen healthy dairy cows treated therapeutically with pirlimycin (i.e. two intramammary doses of 50 mg each, 24 h apart) at peak lactation, and treated with cephalixin (i.e. single intramammary dose of 300 mg into each of four quarters) at the end of lactation. These are typical veterinary-recommended doses for the treatment of clinical mastitis and dry cow preventative therapy, respectively. Cows were housed in a free stall barn for 12 days, during which all manure generated was collected by hand, and then either composted or stored untreated prior to field application at Kentland Farm in southwest Virginia.

Following generation, manure with antibiotics was stockpiled for future amendment application for 57 days. Meanwhile, in accordance with FSMA guidelines, manure slated for composting was mixed with ratios of alfalfa hay (4:1) and sawdust (4:3) to achieve a C:N ratio of 25-30% and a moisture content of 55-65%. A forced aeration static composting approach was used to generate both the antibiotic and antibiotic-free compost in order to best adhere to FSMA guidelines as described in detail by Ray (2017) and Williams (2017). In brief, compost piles (3-4 m³) were stored outside in large metal bins (6 x 2.4 x 1.2 m), and aerated via a perforated PVC pipe system and air pump at the bottom of the bin. The stockpiled manure with antibiotics was stored at the same conditions as the compost in a separate bin at Kentland Farm. Temperature was recorded at 3 different depths (6, 15, and 24 inches) from the top surface of the compost stockpiles daily for the first week, followed by weekly measurements, in order to confirm thermophilic conditions. The FSMA-recommended temperature of >55°C was achieved on day 2 of composting in both the antibiotic-free and antibiotic compost piles. Core temperature remained thermophilic until day 21, though outer temperatures declined into the mesophilic zone (i.e. 35-45°C) after day 7.

3.2.3 Amendment Application to Plots

All plots were pre-treated with glyphosate in summer 2015 in order to clear vegetation prior to tillage for a spring 2016 planting. Post fall 2015 tillage, 3.36 metric ton/ha of hydrolyzed lime was added to the plots to raise the soil pH to 6.5 which is the recommended range for vegetable cultivation (Virginia Cooperative Extension, 2015). Manure/compost/fertilizer amendments were added to plots on March 30th, 2016 (i.e., Experiment Day 1); (Table 3.2).

Table 3.2. Amendment Description

Amendment	n	Description	Additional N-P-K Required
No Amendment Control	3	No fertilizer on barren plots	No
Inorganic Fertilizer Control	6	Inorganic chemical N-P-K added	No
Compost without Antibiotics	6	Composted manure from lactating dairy cattle that did not receive antibiotics	Yes
Compost with Antibiotics	6	Composted manure from lactating dairy cattle that did receive antibiotics	Yes
Manure with Antibiotics	6	Raw manure from lactating dairy cattle that did receive antibiotics	Yes

Manure and compost were added at a rate of 6.72 Mg/ha in accordance with recommendations by Allen Straw, Virginia Agricultural Research and Extension Area Specialist. Inorganic Nitrogen-Phosphorous-Potassium (N-P-K) was added to the fertilizer control plots at rates recommended for optimal growth for radish (50-50-50) and lettuce (125-100-100) (Virginia Cooperative Extension, 2015). Because the manure/compost was not nutritionally sufficient alone to meet these optimal growth levels, supplemental inorganic N-P-K was also applied to the manure and compost plots at rates of 50-50-20 for radish and 100-100-75 for lettuce.

3.2.4 Vegetable Planting and Harvesting:

Radish seeds and emergent lettuce sprouts obtained from a local grower were planted on April 27, 2016 (Day 30 of the study) per vegetable spacing requirements (Virginia Cooperative Extension, 2015). It is worth noting that the eight-week old lettuce transplants, cultivated in a mix of peat and perlite, were supplemented with inorganic fertilizer prior to planting. In the first two weeks of June 2016, 593 kg of radish and 323

kg of lettuce were harvested. Plots amended with antibiotic-treated compost plots yielded the most radishes (66.25 ± 3.1 kg). Plots amended with antibiotic-free compost yielded the most lettuce (26.33 ± 2.2 kg). The inorganic fertilizer amended plots yielded the least for both radish and lettuce (30.0 ± 3.6 kg 14.8 ± 3.1 kg, respectively).

3.3 Soil Sampling and Storage

Soil samples were collected eight times over a period of 120 days post soil amendment application (Table 3.1). During each sampling event, four 5-cm deep soil cores were taken randomly within each 3 m x 3m plot with an 18" soil auger (Agrimart, Owensboro, KY) and homogenized into a single sample. The soil auger was sterilized with Ethanol (EtOH) and rinsed between plots to minimize cross-contamination. Work within plots was always conducted while wearing new sterile gloves and boot covers to ensure no cross-contamination occurred. Samples were collected in sterile whirl-pak bags and transported to the lab on ice for culturable bacteria analysis. All soils were analyzed for moisture content, and the average dry-wet ratio over 120 days was $87.5 \pm 0.06\%$.

3.4 Antibiotic Resistant Bacteria Analysis

Sample processing began approximately one-hour post sample collection. Total and antibiotic-resistant fecal coliforms were enumerated on MacConkey agar (Difco Laboratories, Sparks, MD) following appropriate serial dilutions. Total fecal coliforms were enumerated on plain MacConkey agar, while an additional five agars supplemented with varying levels of one of five antibiotics to enumerate resistant bacteria (Table 3.3). When available, levels of antibiotics added to the MacConkey agar adhered to known EUCAST minimum inhibitory concentrations (MIC) for wildtype *E. coli*. For those antibiotics without known *E. coli* MICs, concentrations reflect preliminary antibiotic tolerance studies (Guron, 2015); therefore, microorganisms growing on these agar plates are best described as antibiotic tolerant, not truly resistant. For the sake of clarity however, subsequent sections will refer to recovered coliforms as resistant.

Table 3.3. Antibiotic Concentrations

Antibiotic	Concentration (µg/ ml)	Reference	Antibiotic Class
Ceftazidime	0.05	EUCAST, 2016	Cephalosporin
Clindamycin	35	Guron, 2015	Lincosamide
Erythromycin	40	Guron, 2015	Macrolide
Sulfamethoxazole	100	Guron, 2015	Sulfonamide
Tetracycline	8	EUCAST, 2016	Tetracycline

Plates were incubated for 24 hours at 37°C. All colonies, less than 300 per plate, that appeared dark pink or red were counted as total fecal coliforms and calculated based on coliform forming units (CFU).

3.5 Statistical Analysis

All statistical analyses were conducted in RStudio version 1.0.136 (RStudio Team, 2016). As 75% of data points were below the limit of detection, zero-inflated poisson (ZIP) regressions were generated to analyze for statistical significance using a two-part poisson count model and a logistic regression with the PSCL package in R. ZIP regressions model the “excess” zeros in the data set independently from the count values, then determine the significance of the count values in conjunction with the previous significance modeled from the zero counts (Long, 1997). The final model is a combination of the probabilities from both zero and counted values, and accounts for the over dispersion and excess zeros that cannot be predicted by solely a Poisson model. Data followed a lognormal distribution, which was similar to results from paired microcosm and greenhouse studies (Williams, 2017, Guron, 2016). Unless otherwise noted, $\alpha = 0.05$ ($p < 0.05$) was used as a marker of significance. As data collected for fecal coliforms resistant to either Sulfamethoxazole or Tetracycline contained zero values for over 95% of the dataset quantitative statistics were not used in these analyses.

4. RESULTS

Immediately following soil amendment application (i.e., manure, compost, inorganic fertilizer), resistant bacteria growth was observed on each of the antibiotic supplemented agars. However, the persistence of these bacteria, as evidenced by continued detection on subsequent sampling days, differed sharply between antibiotics. Patterns of detection fell into three main groups: 1) continued detection (total fecal coliform counts and ceftazidime resistant fecal coliform counts); 2) an initial decline below detection followed by a post-harvest spike (erythromycin and clindamycin resistant fecal coliform counts); and 3) an initial sharp decline and no further recovery (sulfamethoxazole and tetracycline resistant fecal coliform counts).

4.1 Total Fecal Coliforms and Ceftazidime-Resistant Fecal Coliforms

Total quantifiable levels of fecal coliforms were observed in all soil treatments over the duration of the experimental study (Fig. 4.1A). It is worth noting that levels appeared to decrease over much of the cultivation period (the first 56 days), and then increased after vegetable harvest and large rain events. Total fecal coliform levels were highest on Day 90. At the end of the study (Day 120), coliform levels were still greater than observed on Day 0 ($p < 0.05$). The highest fecal coliform counts were recorded in the compost without antibiotic treated plots, followed by compost with antibiotics, manure with antibiotics, inorganic fertilizer, then no amendment control (bare) plots.

Total fecal coliform levels in the bare control plot soils were different than levels in soils that received amendments over the course of the entire experimental study (i.e., inorganic fertilizer, compost, manure; ($p < 0.05$), as would be expected (Table 4.1, full R code outputs provided in Appendix A).

Table 4.1. ZIP Model, Excess Zero Outputs, for Total Fecal Coliforms with respect to Treatment and Time. ($p < 0.001 = ***$, $p < 0.01 = **$, $p < 0.05 = *$)

Zero-inflation Poisson Model	Estimate (β)	Pr(> z)	
No Amendment Control at Day -1	-1.49	0.004	**
Fertilizer Control	0.18	0.682	
Compost without ABX	-0.56	0.233	
Compost with ABX	-0.31	0.489	
Manure with ABX	-0.23	0.603	
Day 0	0.36	0.465	
Day 7	0.49	0.473	
Day 28	0.93	0.043	
Day 42	1.60	0.000	***
Day 56	1.42	0.002	**
Day 90	-1.27	0.044	*
Day 90	0.11	0.814	

Total fecal coliform levels were not different with respect to vegetable grown; however, the levels in plots that grew either lettuce or radish were greater than levels in the plots that did not grow vegetables ($p < 0.05$); (Table 4.2).

Table 4.2. ZIP Model, Excess Zero Outputs, for Total Fecal Coliforms with respect to Vegetable and Time. ($p < 0.001 = ***$, $p < 0.01 = **$, $p < 0.05 = *$)

Zero-inflation Poisson Model	Estimate (β)	Pr(> z)	
No Vegetable at Day -1	-1.02	0.019	*
Lettuce	-0.14	0.711	
Radish	-0.02	0.957	
Day 0	-0.11	0.768	
Day 7	0.72	0.048	*
Day 28	0.33	0.368	
Day 42	1.02	0.004	**
Day 56	0.82	0.023	*
Day 90	-1.86	0.001	**
Day 120	-0.47	0.239	

Time was a significant factor for treatment on Days -1, 42, 56, 90 and vegetable on Days -1, 7, 42, 56, 90, indicating that with respect to day -1 in the barren control plots, fecal coliform counts increased over time ($p < 0.05$).

Although the barren control plots were different with respect to the other four treatments, there was no difference in total fecal coliform levels between the inorganic fertilizer, compost without antibiotic, compost with antibiotic, and manure with antibiotic plots. However, some interactions with time were significant. Total fecal coliform levels in inorganic fertilizer were significantly greater than the levels in the bare plots on Days -1, 28, 56, and 120 ($p < 0.05$). Total fecal coliform levels in compost without antibiotic were significantly greater than the levels in the bare for the entire 120 days ($p < 0.05$). Total fecal coliform levels in compost with antibiotic were significantly greater than the levels in the bare plots on Days -1, 56, and 120 ($p < 0.05$). Total fecal coliform levels in compost without antibiotic were significantly greater than the levels in the bare plots on Days -1, 0, 90 and 120 ($p < 0.05$).

Ceftazidime-resistant fecal coliform growth was observed in all treatments over the duration of the experimental study with patterns similar to the total fecal coliform persistence trends (Fig. 4.1B). Ceftazidime-resistant fecal coliform levels were also highest on Day 90 and greater on the last day of the study than on Day 0. The highest counts were recorded in the compost without antibiotic treated plots, followed by compost with antibiotics, bare, manure with antibiotics, then inorganic fertilizer plots.

Treatment itself was not significant for ceftazidime-resistant fecal coliform levels in all plots over the course of the experimental study; however, with respect to time, the inorganic fertilizer control soil levels were significantly greater than levels in the bare plots on Days -1, 0 and 120 ($p < 0.05$); (Table 4.3, R code outputs, Appendix B).

Table 4.3. ZIP Model, Excess Zero Outputs, for Ceftazidime- Resistant Fecal Coliforms with respect to Treatment and Time. ($p < 0.001 = ***$, $p < 0.01 = **$, $p < 0.05 = *$)

Zero-inflation Poisson Model	Estimate (β)	Pr(> z)	
No Amendment Control at Day -1	0.58	0.367	
Fertilizer Control	0.01	0.979	
Compost without ABX	-0.42	0.345	
Compost with ABX	-0.07	0.882	
Manure with ABX	-0.37	0.410	
Day 0	-1.65	0.003	**
Day 7	-1.14	0.080	
Day 28	-0.06	0.274	
Day 42	-0.64	0.240	
Day 56	-0.87	0.110	
Day 90	-3.13	0.000	***
Day 90	-1.87	0.003	**

Ceftazidime-resistant fecal coliform levels were different with respect to vegetable grown ($p < 0.05$); on Day 56 in the radish plots; however, there was no difference with respect to vegetable for every other time point sampled in this study. Time was a significant factor for treatment on Days 0, 90, 120 and vegetable on Days 0, 28, 42, 56, 90 ($p < 0.05$); (Table 4.3; Table 4.4).

Table 4.4. ZIP Model, Excess Zero Outputs, for Ceftazidime- Resistant Fecal Coliforms with respect to Vegetable and Time. ($p < 0.001 = ***$, $p < 0.01 = **$, $p < 0.05 = *$)

Zero-inflation Poisson Model	Estimate (β)	Pr(> z)	
No Vegetable at Day -1	0.91	0.110	
Lettuce	-0.20	0.629	
Radish	0.13	0.751	
Day 0	-2.15	2.34E-05	***
Day 7	-0.70	0.151	
Day 28	-1.06	0.029	*
Day 42	-1.15	0.019	*
Day 56	-1.38	0.005	**
Day 90	-3.62	1.07E-08	***
Day 120	-2.02	6.26E-05	***

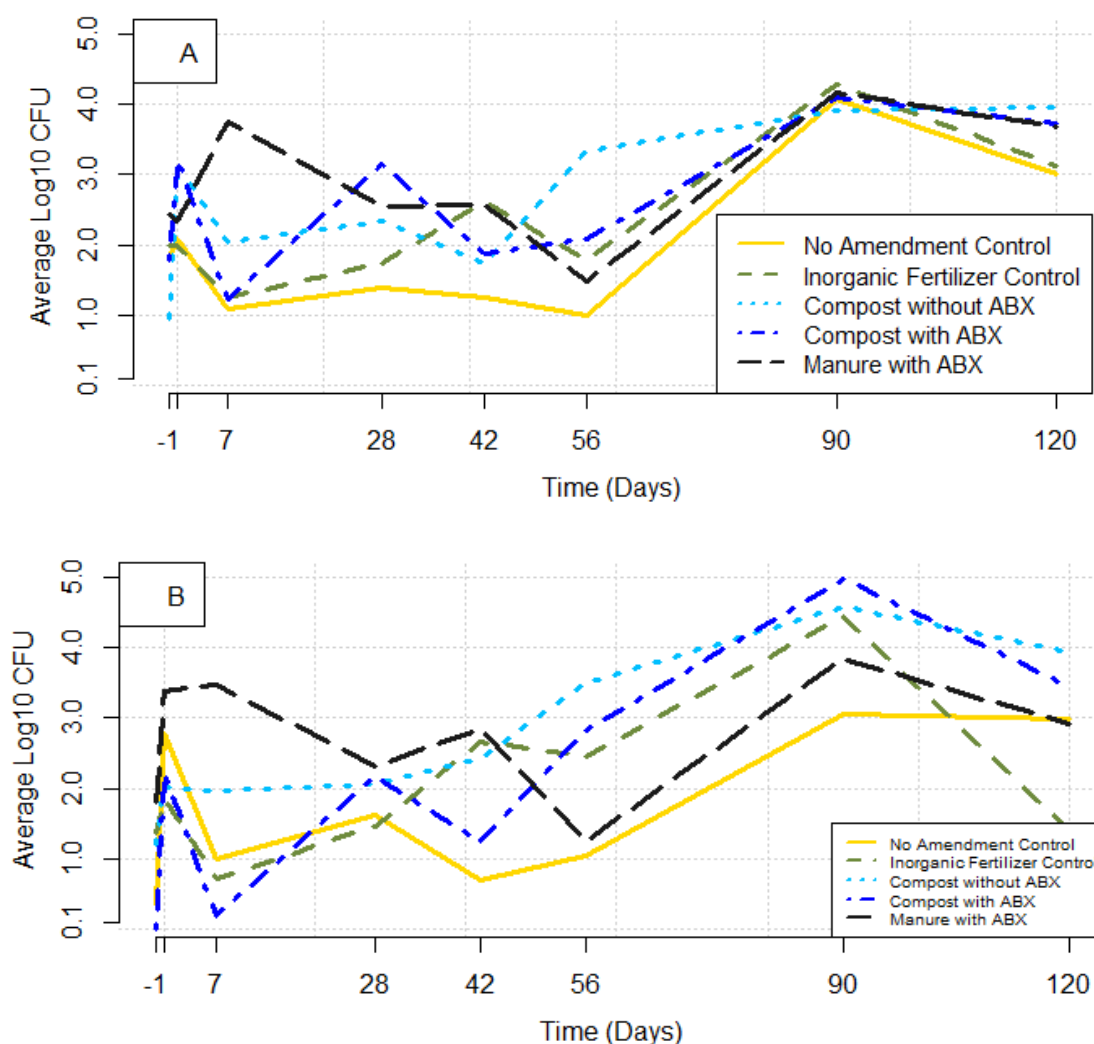


Figure 4.1. A) Average Total; and B) Average Cefazidime-Resistant Fecal Coliform Counts over the 120-day study.

4.2 Clindamycin- and Erythromycin-Resistant Fecal Coliforms

Clindamycin-resistant fecal coliform counts were observed in all treatments on Day 0 (i.e., immediately following application), but declined rapidly during the first week. On Day 42, levels were below detection in the inorganic fertilizer and antibiotic-free compost plots, and by Day 56 counts declined below the detection limit in all plots (Fig.

4.2A). Counts of clindamycin-resistant fecal coliforms remained undetectable in all plots, until Day 120 when there was a spike in resistant coliforms for all treatments.

Clindamycin-resistant fecal coliform levels in soils that received manure with antibiotics were significantly greater than levels in soils collected from the barren control plots ($p < 0.05$), as would be expected (Table 4.5, R code results, Appendix C).

Table 4.5. ZIP Model, Excess Zero Outputs, for Clindamycin- Resistant Fecal Coliforms with respect to Treatment and Time. ($p < 0.001 = ***$, $p < 0.01 = **$, $p < 0.05 = *$)

Zero-inflation Poisson Model	Estimate (β)	Pr(> z)	
No Amendment Control at Day -1	2.83	3.65E-08	***
Fertilizer Control	8.92E-06	1.000	
Compost without ABX	-2.63E-02	0.967	
Compost with ABX	-0.44	0.463	
Manure with ABX	-1.27	0.023	*

The organic fertilizer and both compost amendments were not significantly different than the bare plots. Clindamycin-resistant fecal coliform levels were not significantly different with respect to vegetable grown; however, the levels in plots that grew either lettuce or radish were significantly greater than levels in the plots that did not grow vegetables ($p < 0.05$). Time was not a significant factor for treatment and vegetable ($p > 0.05$); (Table 4.6).

Table 4.6. ZIP Model, Excess Zero Outputs, for Clindamycin- Resistant Fecal Coliforms with respect to Vegetable and Time. ($p < 0.001 = ***$, $p < 0.01 = **$, $p < 0.05 = *$)

Zero-inflation Poisson Model	Estimate (β)	Pr(> z)	
No Vegetable at Day -1	2.83	3.65E-08	***
Lettuce	-0.56	0.307	
Radish	-0.52	0.345	

Erythromycin-resistant fecal coliform growth was observed on Day 0 in the antibiotic-free compost, antibiotic compost, and manure with antibiotics amended plots, but levels in the bare control and chemical fertilizer plots were below detection limits. Levels declined sharply in the manure and compost plots and were below detection in al

plots by Day 56 (Fig. 4.2B). On Day 90, erythromycin-resistant fecal coliform levels rebounded and were detectable in the compost without antibiotic and manure with antibiotic plots. By Day 120, there was detection in all treatments, including the bare and inorganic fertilizer plots, which did not yield detectable levels at the onset of the study.

Erythromycin-resistant fecal coliform levels in soils that received amendments were significantly different (antibiotic-free compost > manure > inorganic fertilizer > antibiotic compost) than levels in soils collected from the barren control plots ($p < 0.05$) (Table 4.7, R code output, Appendix D). Erythromycin-resistant fecal coliform levels were greater in soils that grew radish than soils that grew lettuce ($p < 0.05$); (Table 4.8). However, time was not a significant factor for treatment and vegetable ($p > 0.05$).

*Table 4.7. ZIP Model, Excess Zero Outputs, for Erythromycin-Resistant Fecal Coliforms with respect to Treatment and Time. ($p < 0.001 = ***$, $p < 0.01 = **$, $p < 0.05 = *$)*

Zero-inflation Poisson Model	Estimate (β)	Pr(> z)	
No Amendment Control at Day -1	-2.29	0.084	
Fertilizer Control	3.67	0.001	**
Compost without ABX	4.13	3.00E-04	***
Compost with ABX	1.08	0.005	***
Manure with ABX	3.79	0.001	**
Day 0	-2.78	3.00E-04	***
Day 7	-0.07	0.933	
Day 28	-0.19	0.841	
Day 42	0.30	0.736	
Day 56	0.53	0.674	
Day 90	0.11	0.895	
Day 90	0.21	0.793	

Table 4.8. ZIP Model, Excess Zero Outputs, for Erythromycin- Resistant Fecal Coliforms with respect to Vegetable and Time. ($p < 0.001 = ***$, $p < 0.01 = **$, $p < 0.05 = *$)

Zero-inflation Poisson Model	Estimate (β)	Pr(> z)	
No Vegetable at Day -1	-1.31	0.318	
Lettuce	3.83	7.00E-05	***
Radish	3.99	4.00E-03	***
Day 0	-2.84	9.16E-05	***
Day 7	-0.47	0.604	
Day 28	-1.00	0.279	
Day 42	-0.57	0.545	
Day 56	0.31	0.718	
Day 90	-0.70	4.41E-01	
Day 120	-0.78	3.11E-01	

It is worth noting that on Day 120, for both clindamycin- and erythromycin-resistant fecal coliforms, the greatest average CFU recorded was in the same replicate plot of the no amendment control treatment. The other two replicates of the same treatment had zero CFU.

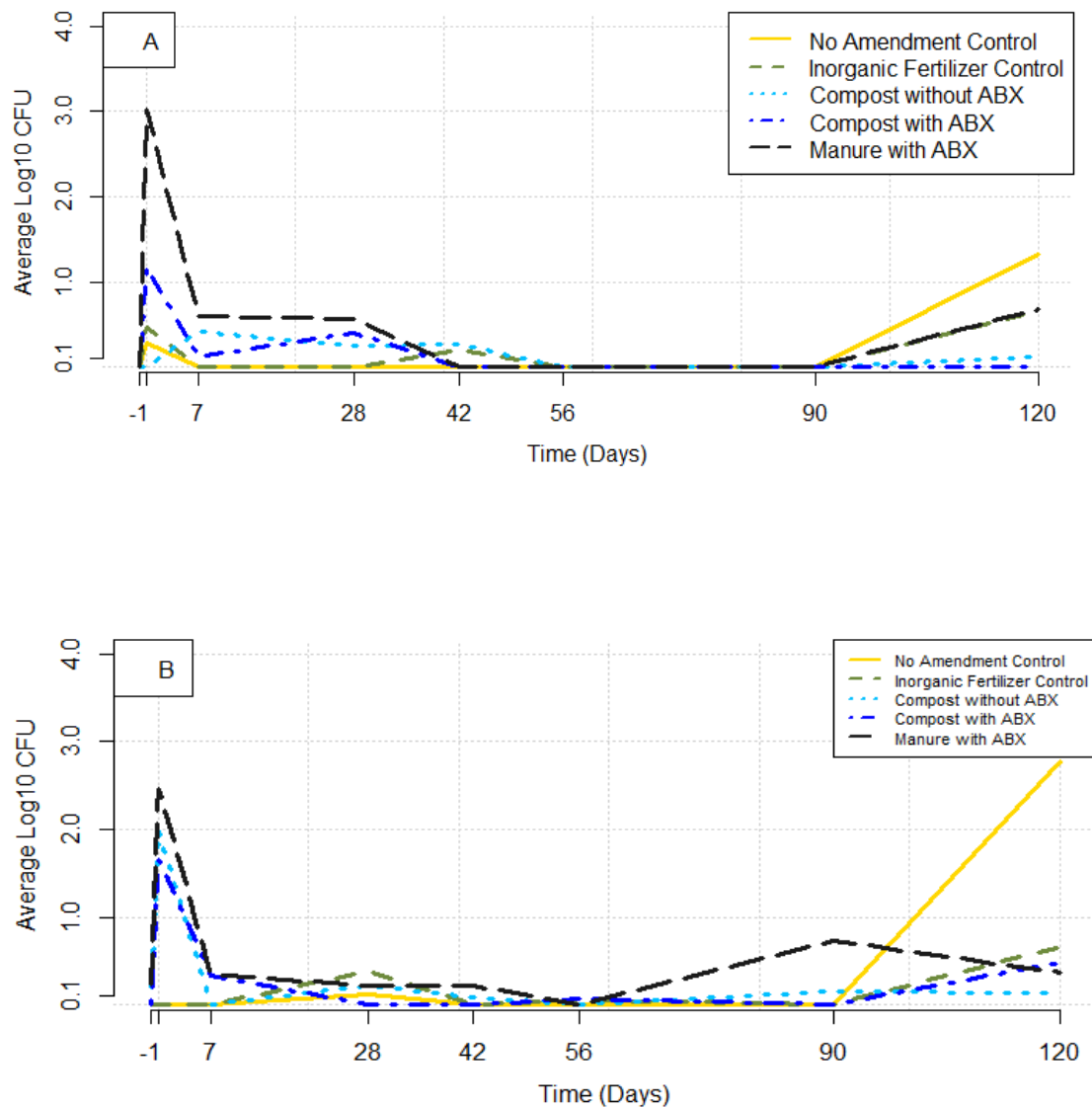


Figure 4.2. A) Average Clindamycin-Resistant; and B) Average Erythromycin-Resistant Fecal Coliform Counts over the 120-day study.

4.3 Sulfamethoxazole- and Tetracycline-Resistant Fecal Coliforms

Sulfamethoxazole-resistant total coliform growth was only observed on Day 0 in the manure with antibiotics amended plots. There was no detection throughout the 120 days for the bare, inorganic fertilizer control, antibiotic-free compost, and antibiotic

compost amended plots (Fig. 4.3A). Counts of sulfamethoxazole-resistant total coliforms remained detectable in the raw manure amended plots until Day 28, and then declined below detection for the remainder of the experimental period.

Tetracycline-resistant total coliform growth was only observed on Day 0 in the antibiotic-free compost and manure with ABX amended plots. There was no detection throughout the 120 days for the bare, inorganic fertilizer control, and antibiotic compost amended plots (Fig. 4.3B). Counts of tetracycline-resistant total coliforms remained detectable in the antibiotic-free compost and raw manure amended plots until Day 42. Antibiotic-free compost amended plots declined below detection for the remainder of the study, and manure with ABX was detected on Day 90, and then also declined below detection on Day 120.

Quantitative statistical analyses were not appropriate since >95% of the total observations of sulfamethoxazole and tetracycline resistant fecal coliforms were below detection over the study period (Cameron and Trivedi, 2012).

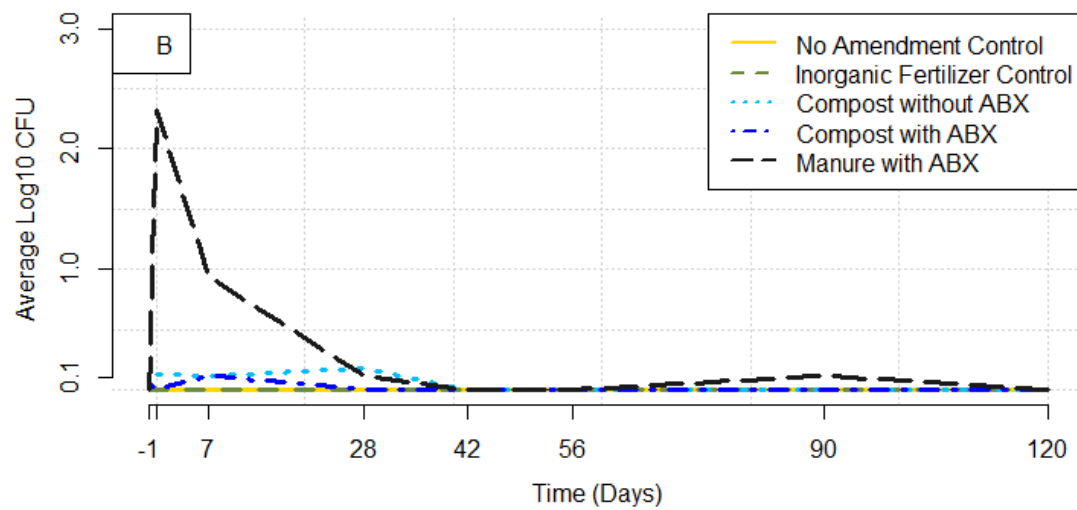
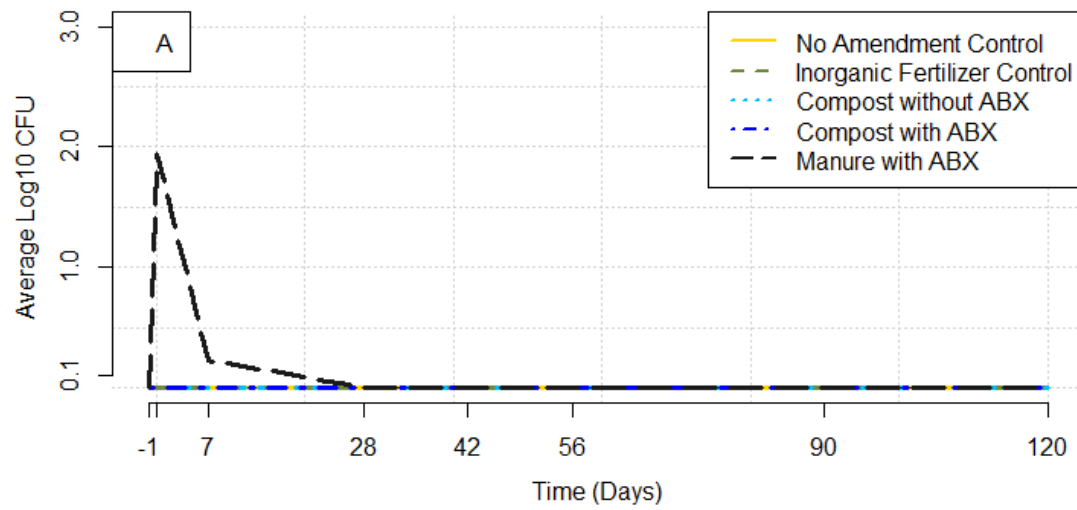


Figure 4.3. A) Average Sulfamethoxazole-Resistant; and B) Average Tetracycline-Resistant Fecal Coliform Counts over the 120-day study.

4.4 Average, Minimum, and Maximum LOG₁₀ Colony Counts Over 120 Days

Over the course of 120 days, the soils amended with manure with antibiotics had the highest average total fecal coliforms enumerated (2.87 LOG₁₀ CFU). As expected, the barren control soils had the lowest average total fecal coliforms enumerated (1.96 LOG₁₀ CFU); (Table 4.9).

Table 4.9. Average, Minimum, and Maximum LOG₁₀ CFU per gram of Soil for Each Treatment over the 120-Day Study.

Treatment	Total Fecal Coliforms	Ceftazidime	Clindamycin	Erythromycin	Sulfamethoxazole	Tetracycline
No Amendment Control (min, max)	1.96 (0, 4.49)	1.7 (0, >10 ³)	0.2 (0, 4.08)	0.36 (0, 3.96)	0 (0,0)	0 (0,0)
Fertilizer Control (min, max)	2.35 (0, 6.48)	2.07 (0, >10 ³)	0.16 (0, 4.16)	0.14 (0, 3.73)	0 (0,0)	0 (0,0)
Compost without ABX (min, max)	2.7 (0, 6.83)	2.89 (0, >10 ³)	0.13 (0, 2.78)	0.32 (0, 3)	0 (0,0)	0.05 (0, 3.2)
Compost with ABX (min, max)	2.64 (0, 5.62)	2.33 (0, >10 ³)	0.21 (0, 3.17)	0.32 (0, 3.92)	0 (0,0)	0.02 (0, 2)
Manure with ABX (min, max)	2.87 (0, 5.62)	2.85 (0, >10 ³)	0.61 (0, 4.67)	0.57 (0, 4.52)	0.27 (0, 4.17)	0.44 (0, 4.9)

The soils amended with manure with antibiotics also retained the highest average CFU counts for all antibiotics tested; except ceftazidime, which had the highest average CFU counts in the antibiotic-free amended soils. The soils and treatments with lettuce plants had the highest average CFU counts for all antibiotics tested; except sulfamethoxazole, which had the highest average CFU counts by 0.06 LOG₁₀ CFU in the radish grown soils (Table 4.10).

Table 4.10. Average, Minimum, and Maximum LOG₁₀ CFU per gram of Soil for Each Treatment over the 120-Day Study

Vegetable	Total Fecal Coliforms	Ceftazidime	Clindamycin	Erythromycin	Sulfamethoxazole	Tetracycline
No Vegetable Control (min, max)	1.97 (0, 4.49)	1.7 (0, >10 ³)	0.2 (0, 4.08)	0.36 (0, 3.96)	0 (0,0)	0 (0,0)
Lettuce (min, max)	2.7 (0, 6.83)	2.61 (0, >10 ³)	0.27 (0, 4.26)	0.39 (0, 4.52)	0.04 (0, 3.04)	0.13 (0, 3.32)
Radish (min, max)	2.58 (0, 5.62)	2.43 (0, >10 ³)	0.27 (0, 4.67)	0.28 (0, 3.73)	0.1 (0, 4.17)	0.12 (0, 4.9)

4.5 Average Total and Antibiotic-Resistant Fecal Coliforms Based on Vegetable

Although there was no significance of crop type, root or above-ground, affecting total and antibiotic-resistant CFU enumerated throughout the 120 study, the average CFU counts based on vegetable grown followed the similar trends to the treatment groupings in relation to antibiotic tested. Total and ceftazidime-resistant coliforms were always detected, clindamycin and erythromycin-resistant coliforms declined below detection and rebounded, and sulfamethoxazole and tetracycline-resistant fecal coliforms declined below detection after Day 1 (Fig. 4.4).

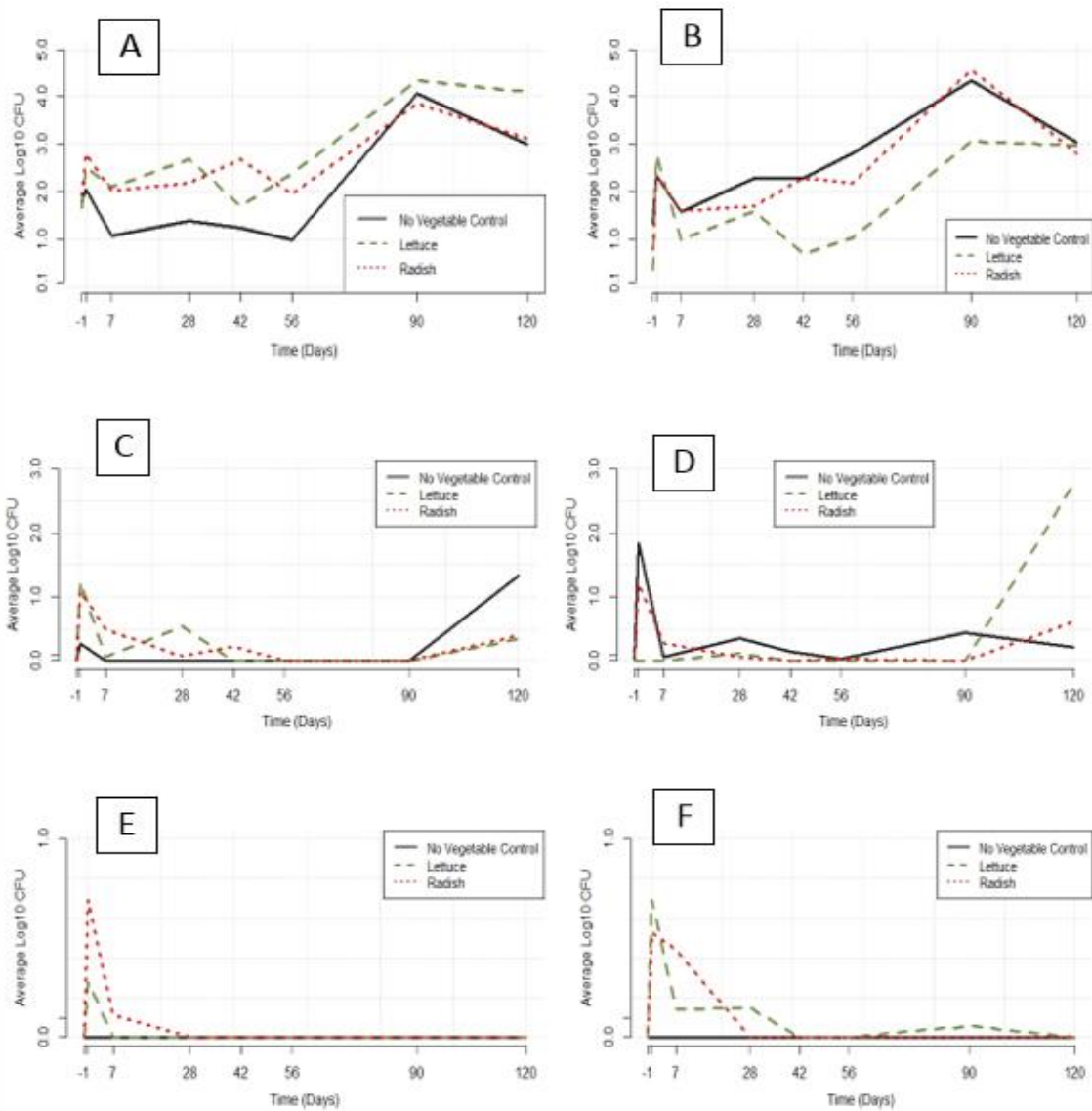


Figure 4.4. Average; A) Total; B) Ceftazidime-Resistant; C) Clindamycin-Resistant; D) Erythromycin-Resistant; E) Sulfamethoxazole-Resistant; and F) Tetracycline-Resistant Fecal Coliform Counts over the 120-Day Study.

5. DISCUSSION

Patterns of persistence amongst antibiotic-resistant fecal coliforms differed between the antibiotics analyzed. Potential reasons for these differences include: 1) antibiotic class; 2) the presence of naturally occurring ARBs; 3) differential survival during composting; and 4) the use of inorganic chemical fertilizer.

5.1 Antibiotic Class

The antibiotics administered to the dairy cattle prior to manure collection and composting processes were pirlimycin and cephapirin (Ray et al., 2017). Pirlimycin belongs to the antibiotic class lincosomides and cephapirin belong to the macrolides. Lincosimides and macrolides are similar in their modes of action, where they bind to the DNA subunit during bacterial transfer on the RNA and subsequently inhibit the initiation of protein synthesis (Mcdermott et al., 2003). Both antibiotic classes are highly rated by the WHO as high risk of antibiotic resistance to public health due to the widespread number of bacterial infections that they are commonly used to treat (Leclercq and Courvalin, 1991; WHO, 2011). The biochemical mechanisms behind the modes of action for lincosamides and macrolides make them more susceptible to resistance because their sequences for protein synthesis are easily accessible to resistant genes (Leclercq and Courvalin, 1991). Furthermore, resistant genes are usually derived from a common ancestral link, such as an antibiotic producer (i.e.; *erm* genes to erythromycin treated bacteria DNA; Arthur et al., 1987).

Of the antibiotic-resistant fecal coliforms quantified in this study, only erythromycin and clindamycin were of the same antibiotic classes as the antibiotics used to treat the dairy cattle. The detection of the clindamycin-resistant (lincosamide) and erythromycin-resistant (macrolide) fecal coliforms throughout this study were therefore likely due to the presence of the same class of antibiotics within the manure. It is particularly important to sequence and characterize the antibiotic resistant genes that give rise to the clindamycin and erythromycin resistant fecal coliforms because it may lead to the discovery of multidrug-resistance genes that are common by antibiotic class

(Fischbach and Walsh, 2009). Multidrug-resistance to Gram-negative bacterial infections, such as *E. coli*, are of serious threat to human health because they are untreatable (Falagas et al., 2005).

Alternatively, sulfamethoxazole-resistant and tetracycline-resistant fecal coliforms were not detected over the course of this study, which is not surprising, as these or related antibiotics were not administered to the dairy cattle. Ceftazidime-resistant fecal coliforms were detected at high levels over the course of 120 days although their respective antibiotic class, 3rd generation cephalosporin, was not administered to the dairy cattle.

5.2 Naturally Occurring Antibiotic Resistant Bacteria

Of all the antibiotic-resistant fecal coliforms tested, ceftazidime-resistant fecal coliforms had the highest levels in all treatments. In the bare control soils alone, 50% of all coliforms recovered on ceftazidime agars were resistant. Additionally, the percent of ceftazidime-resistance increased as severity of amendment increased (inorganic fertilizer = 59%, compost without antibiotic = 63%, compost with antibiotic = 65%, manure with antibiotic = 71%). One theory could be that the ceftazidime concentration in the agar (0.05 µg/ml) was too small, and there was not enough antibiotic present to quantify actual resistance. In this case, ceftazidime-resistant fecal coliforms would persist similarly to the total fecal coliforms, as it did in the study. However, the 0.05 µg/ ml concentration used in this study was the known MIC for ceftazidime (Table 3.3). Alternatively, since 0.05 µg/ml is the concentration the pharmaceutical industry uses as a baseline for bacterial growth; the occurrence and persistence of ceftazadime-resistant fecal coliforms may reflect the presence of naturally occurring resistant bacteria in the soil. A review by Wellington et al. (2013) of natural antibiotic resistance to Gram-negative bacteria suggests that the mobile resistome is constantly co-selecting multidrug-resistant genes and it is ever expanding. D'Costa et al. (2006) similarly reported that after sampling 480 soil-derived bacterial isolates from urban, forest, and agricultural sources, every strain

analyzed was multi-drug resistant to 7-8 antibiotics on average. Regardless of origin, antibiotic resistance is naturally occurring in the soil resistome (D'Costa et al., 2006).

5.3 Differential Survival during Composting

Composting is a manure treatment method designed to decrease total pathogenic bacteria and fecal indicator organisms, while retaining plant available nutrients for later soil amendment (Larney et al., 2003). While many studies have effectively quantified reductions in bacteria such as fecal coliforms following composting (Sharma et al., 2009; Qian et al., 2016), in this study ceftazidime-resistant, and total fecal coliform levels were greater in the soils receiving compost as compared to the soils that received raw manure. Total fecal coliforms were 22% more likely to be recovered in the compost without antibiotic soils, and 6% more likely to be recovered in the compost with antibiotic soils relative to recovery in the raw manure soils, as indicated by the β coefficient in the ZIP models (Appendix A, B, C, D). The ceftazidime-resistant fecal coliform levels were greater by 5% in the compost with antibiotic soils than the raw manure soil levels. This is not surprising, given that parallel work examining the composting practice in details indicated an increase in phenotypic resistance in the compost ARGs compared to the manure ARGs (Williams, 2017).

Composting as a manure treatment was tested to see if it affected total and antibiotic-resistant fecal coliforms levels in soils after treatment amendment. The persistence of some bacteria throughout the composting process may prove an issue if this process selects for bacteria with multiple survival strategies including resistance to antibiotics; under future favorable conditions, this would mean the strongest pathogens could regrow (Kim et al., 2009). Kim et al. (2009) found that the compost provides favorable conditions and available nutrients for pathogenic regrowth when compost processes stay between 22°C and 35°C. Similarly, Gong et al. (2005) found that pathogenic *E. coli* regrowth might occur at even greater temperatures. *E. coli* and total fecal coliforms were detected following composting at temperatures between 54°C and

67°C. Survival of pathogenic bacteria after composting is not solely dependent on temperature, but also on specific moisture contents and stationary phases of bacteria (Gong et al., 2005).

Survival of pathogenic bacteria after composting may be very time specific. Gondim-Porto et al. (2016) found that after composting fecal coliforms not only survived, but levels actually increased and persisted in the soils for two years after amendment application. Another manure compost study, found that fecal coliforms survived in the soil for many weeks after amendment, with no measurable decay (Stocker et al., 2015). However, there were no significant differences between compost and raw manure bacteria counts in the present case. Stocker et al. (2015) also found that *E. coli* levels increased in soil after rain events. Composting gives rise to thermotolerant pathogenic bacteria, changes enzymatic capabilities, and ultimately may lead to an increase in bacterial survival (Gonzalez-Lopez et al., 2015).

5.4 Inorganic Fertilizer Supplementation

As per normal farming practices, inorganic fertilizer was applied to plots amended with dairy manure and compost to meet the lettuce and radish N-P-K requirements. The inorganic fertilizer soils acted as a second control in this study to evaluate whether or not the addition of inorganic fertilizer alone affected the total and antibiotic-resistant fecal coliform levels in the soil. Inorganic fertilizer did not have a significant effect on the resistance of fecal coliforms detected in this study, and the inorganic fertilizer antibiotic-resistant fecal coliform levels were less than the manure and compost soils, except in the case of erythromycin-resistant fecal coliform levels. From this study, the addition of inorganic fertilizer did not appear to have an effect on the coliform levels found in the compost and manure.

Rahube et al. (2014) did find differences between manure and inorganic fertilizer amendments when analyzing ARB levels. Marti et al. (2013) found that inorganic

fertilization did not have an effect, but soil liming did have an effect. As is typical, we added lime to the soil to increase soil pH for vegetable growth optimization. from 5.5 to 6.5. It would be interesting to compare treatment with and without lime in future studies to isolate this effect.

Antibiotic resistant bacteria are often analyzed in parallel with antibiotic resistant genes (ARGs). Although Rahube et al (2014) did not find differences in ARBs with inorganic fertilizer; they did find that ARG levels were significantly different when compared to soils amended with inorganic fertilizer. Novlak et al. (2016) found that inorganic fertilization enhances overall ARG abundance, and alters soil chemistry. Inorganic fertilizer increases carbon and nitrogen ratios and soil pH, which provide more nutrients and alters soil chemistry for the microbial community (Novlak et al., 2016). Inorganic fertilizer increases organic matter which may lead to an increase in ARBs and ultimately ARGs (Novlak et al., 2016). Soil characterization before treatment amendment is imperative to determine if pH, lime, soil type, nutrient content, and existing microbial populations will affect the ARB and ARG levels.

6. CONCLUSIONS

Over the course 120 days, antibiotic resistant fecal coliform levels were quantified and analyzed with respect to treatment amended, time spent, and vegetable grown. Following the objectives of this study, these conclusions may be made:

1) Does the addition of antibiotic-treated manure and compost alter antibiotic resistant fecal coliform levels in soil relative to antibiotic-free treated compost?

The effects of antibiotic treated manure and antibiotic treated compost on the levels of antibiotic resistant fecal coliform levels in soil was dependent on the type of resistance examined. Regardless of antibiotic treatment, composting was associated with an increase in ceftazidime-resistant fecal coliforms and overall total fecal coliform levels relative to levels in raw manure. Composting decreased clindamycin-resistant and erythromycin fecal coliforms in soils compared to raw manure. Finally, we did not detect sulfamethoxazole-resistant and tetracycline-resistant fecal coliforms, and therefore composting effectiveness cannot be determined.

2) How long do antibiotic resistant fecal coliforms persist in soil following amendment with compost or manure? Are patterns of persistence different between antibiotic classes?

Antibiotic resistant fecal coliforms can persist in the soil at least 120 days past manure or compost soil amendment depending on the class of antibiotic. Specific persistence timelines are dependent on the antibiotic tested and treatment applied. We detected ceftazidime-resistant fecal coliforms, and overall total fecal coliforms and levels increased over the course of the study. We did detect clindamycin-resistant and erythromycin fecal coliforms at the beginning of the study; however, the levels fell below the detection limit in the middle of the study, and notably increased at the end of the study. Lastly, we did not detect sulfamethoxazole-resistant and tetracycline-resistant fecal coliforms over the course of the study.

3) Does the species of vegetable grown in soil alter antibiotic resistant fecal coliform levels in the soil relative to vegetable-free soil?

Erythromycin-resistant fecal coliforms were the only antibiotic-resistant bacteria that was significantly affected by vegetable grown compared to the bare plots in this experiment. Overall, ARB levels were not affected by whether the vegetable was a root, below-ground radish, or leafy, above-ground lettuce head.

This study was partially motivated as a means to evaluate the updated FDA FMSA manure treatment guidelines in decreasing potential pathogenic bacteria in amended soils cultivated with vegetables. From the above findings, compost amended soils had greater quantities of total and ceftazidime-resistant fecal coliforms. However, composting did show a significant decrease in the antibiotic-resistant fecal coliform levels found in the same antibiotic classes, macrolides and lincosamides, that the dairy cattle were treated with at the beginning of this study.

7. FUTURE WORK

This study evaluated the differences and effects of composting opposed to using raw dairy manure as a way to reduce antibiotic resistant fecal coliform levels in vegetable growing soils for a large-scale field study. The evidence suggests that composting did not have a significant effect on reducing total fecal coliforms present, but did decreased antibiotic-resistant fecal coliforms associated with the same class of antibiotics administered to the dairy cattle. Understanding and quantifying the presence of antibiotic resistance in agriculture relies on more than just quantifying antibiotic resistant bacteria levels in the soils; it will also require parallel genetic analysis to quantify potential risks of community and/or consumer exposure.

7.1 Antibiotic Resistant Genes and Metagenomics

Antibiotic resistance may also be acquired through the horizontal transfer of ARGs (Davies and Davies, 2010; Aminov and Mackie, 2007). ARGs are a concern because they may be assimilated by other active bacteria; and potentially contribute to the evolution of antibiotic-resistant human pathogens.

Future analysis of the soil for ARGs corresponding to the antibiotic tested will allow a comparison between the concentration of resistant bacteria found and the quantification of the known genes associated with the resistant bacteria. The comparison between bacteria concentration and gene presence will further enhance understanding how antibiotic resistance moves through the “farm to fork” continuum and identify the most effective points to control resistance in agricultural production. In addition to quantifying specifically targeted resistant genes (like *tetW* to tetracycline, *sul1* to sulfamethoxazole, and *erm* to erythromycin) sequencing of all genes present through metagenomics analysis may identify shifts in the broader soil resistome. Metagenomics is the analysis of all genes in a sample, without specifically having to target for one gene with quantitative polymerase chain reaction (qPCR).

7.2 Comparison of Field Study Runoff and Vegetable Samples

In conjunction with the soils samples analyzed in this study, rain stormwater runoff samples and harvested vegetable samples were collected from the same plots over the course of 120 days. Runoff from fields that have had manure treatment has the potential to contaminant surface and groundwater. Sura et al. (2016) found that after a simulated rainfall on fields amended with antibiotic manure and compost; antimicrobials were detected 21 days after amendment application in the runoff samples collected. This study collected real-time storm events for up to 6 months past the manure application to capture whether ARGs were transferred from the soil surface to the runoff. Highest total runoff volume of precipitation after vegetable planting occurred June 4, 2016. This high volume of runoff and disturbance of vegetable harvesting during the 2nd and 3rd weeks of June could potentially account for the clindamycin and erythromycin-resistant fecal coliform resurgence quantified at the end of the study. Lettuce and radish plants were harvested for ARB and ARG analysis to determine if ARB contamination or horizontal gene transfer occurs from soil to vegetable. Marti et al. (2013) did not find a ARB to ARG correspondence when analyzing vegetables grown in manure and non-amended fields; however, ARG presence was quantified in the vegetables. If there is a direct comparison of soil and vegetable ARBs and ARGs in the present study, it will provide a direct route of exposure from “farm to fork” linking antibiotic resistance in agriculture to human health. Lastly, a mass balance may be calculated to account for where the antibiotic resistance is most critical (soil, runoff, or vegetable) in an agricultural setting.

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APPENDIX A. Zero-Inflated Poisson Model Outputs for No Antibiotic Control Total Fecal Coliform Analyses

Table A.1. Treatment*Time | Treatment + Time ZIP Model

Call:

```
zeroinfl(formula = colony_count ~ offset(dilution) + Treatment * Time
| Treatment + Time, data = C)
```

Pearson residuals:

Min	1Q	Median	3Q	Max
-4.1671	-1.0930	-0.7537	0.4446	138.0249

Count model coefficients (poisson with log link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	5.531089	0.247913	22.311	< 2e-16

TreatmentFertilizer Control	0.253138	0.287610	0.880	0.378783
TreatmentCompost without ABX	-1.034591	0.378038	-2.737	0.006205
**				
TreatmentCompost with ABX	0.346013	0.292516	1.183	0.236853
TreatmentManure with ABX	1.080202	0.264356	4.086	4.39e-05

Time0	1.686911	0.422862	3.989	6.63e-05

Time7	1.373968	0.576903	2.382	0.017236 *
Time28	1.382991	0.528783	2.615	0.008912
**				
Time42	3.496495	0.318746	10.970	< 2e-16

Time56	0.812947	0.686045	1.185	0.236027
Time90	4.054639	0.262858	15.425	< 2e-16

Time120	3.679199	0.275233	13.368	< 2e-16

TreatmentFertilizer Control:Time0	0.285489	0.492747	0.579	0.562332
TreatmentCompost without ABX:Time0	1.768859	0.529394	3.341	0.000834

TreatmentCompost with ABX:Time0	1.446203	0.458573	3.154	0.001612
**				
TreatmentManure with ABX:Time0	2.060983	0.436022	4.727	2.28e-06

TreatmentFertilizer Control:Time7	-0.046508	0.647353	-0.072	0.942727
TreatmentCompost without ABX:Time7	1.935074	0.654658	2.956	0.003118
**				
TreatmentCompost with ABX:Time7	-0.475840	0.650871	-0.731	0.464730
TreatmentManure with ABX:Time7	0.987952	0.590143	1.674	0.094113 .
TreatmentFertilizer Control:Time28	1.362767	0.568446	2.397	0.016514 *
TreatmentCompost without ABX:Time28	2.572666	0.614578	4.186	2.84e-05

TreatmentCompost with ABX:Time28	1.751664	0.557945	3.139	0.001692
**				
TreatmentManure with ABX:Time28	0.922741	0.546226	1.689	0.091162 .
TreatmentFertilizer Control:Time42	2.442665	0.352090	6.938	3.99e-12

TreatmentCompost without ABX:Time42	0.134024	0.468357	0.286	0.774758
TreatmentCompost with ABX:Time42	1.513840	0.357826	4.231	2.33e-05

TreatmentManure with ABX:Time42	-0.337830	0.338798	-0.997	0.318696
TreatmentFertilizer Control:Time56	4.213996	0.703217	5.992	2.07e-09

TreatmentCompost without ABX:Time56	4.834535	0.743314	6.504	7.82e-11

TreatmentCompost with ABX:Time56	4.419076	0.704078	6.276	3.46e-10

TreatmentManure with ABX:Time56	0.997353	0.712597	1.400	0.161632
TreatmentFertilizer Control:Time90	0.585398	0.303320	1.930	0.053611
TreatmentCompost without ABX:Time90	2.200095	0.389724	5.645	1.65e-08

TreatmentCompost with ABX:Time90	-0.003561	0.309692	-0.011	0.990825
TreatmentManure with ABX:Time90	0.550945	0.279925	1.968	0.049046 *
TreatmentFertilizer Control:Time120	0.880618	0.315136	2.794	0.005199
**				
TreatmentCompost without ABX:Time120	3.458097	0.397230	8.706	< 2e-16

TreatmentCompost with ABX:Time120	0.789465	0.319164	2.474	0.013378 *
TreatmentManure with ABX:Time120	0.941222	0.292145	3.222	0.001274
**				

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	-1.4968	0.5203	-2.877	0.004016	**
TreatmentFertilizer Control	0.1809	0.4417	0.410	0.682148	
TreatmentCompost without ABX	-0.5569	0.4668	-1.193	0.232887	
TreatmentCompost with ABX	-0.3114	0.4501	-0.692	0.489009	
TreatmentManure with ABX	-0.2330	0.4480	-0.520	0.603033	
Time0	0.3571	0.4898	0.729	0.465972	
Time7	0.4886	0.6816	0.717	0.473453	
Time28	0.9275	0.4601	2.016	0.043814	*
Time42	1.6033	0.4452	3.602	0.000316	***
Time56	1.4232	0.4537	3.137	0.001707	**
Time90	-1.2871	0.6393	-2.013	0.044087	*
Time120	0.1134	0.4823	0.235	0.814109	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Number of iterations in BFGS optimization: 56

Log-likelihood: -1.107e+04 on 52 Df

Table A.2. Vegetable*Time | Vegetable + Time ZIP Model.

Call:

```
zeroinfl(formula = colony_count ~ offset(dilution) + Vegetable * Time |
Vegetable + Time, data = C)
```

Pearson residuals:

Min	1Q	Median	3Q	Max
-3.5837	-1.1817	-0.9196	0.2529	160.5663

Count model coefficients (poisson with log link):

	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	5.5556	0.2426	22.896	< 2e-16	***
VegetableLettuce	0.2254	0.2691	0.838	0.402179	
VegetableRadish	0.7401	0.2565	2.885	0.003915	**
Time0	1.6629	0.4200	3.959	7.51e-05	***
Time7	1.6136	0.5769	2.797	0.005160	**
Time28	1.3288	0.5246	2.533	0.011315	*
Time42	3.4720	0.3147	11.033	< 2e-16	***
Time56	0.7480	0.6810	1.098	0.272045	
Time90	4.0302	0.2579	15.627	< 2e-16	***
Time120	3.6547	0.2705	13.511	< 2e-16	***
VegetableLettuce:Time0	1.4029	0.4420	3.174	0.001502	**
VegetableRadish:Time0	1.5088	0.4313	3.499	0.000468	***
VegetableLettuce:Time7	1.0059	0.5966	1.686	0.091818	.
VegetableRadish:Time7	0.5609	0.5913	0.948	0.342898	
VegetableLettuce:Time28	1.6185	0.5426	2.983	0.002858	**
VegetableRadish:Time28	1.2410	0.5372	2.310	0.020883	*
VegetableLettuce:Time42	1.9487	0.3372	5.780	7.49e-09	***
VegetableRadish:Time42	0.4694	0.3278	1.432	0.152197	
VegetableLettuce:Time56	4.0596	0.6914	5.872	4.32e-09	***
VegetableRadish:Time56	3.2256	0.6875	4.692	2.71e-06	***
VegetableLettuce:Time90	0.9307	0.2840	3.277	0.001049	**
VegetableRadish:Time90	0.2447	0.2725	0.898	0.369148	
VegetableLettuce:Time120	1.9438	0.2951	6.587	4.48e-11	***
VegetableRadish:Time120	0.2905	0.2856	1.017	0.309125	

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	-1.02178	0.43360	-2.356	0.01845	*
VegetableLettuce	-0.14459	0.39097	-0.370	0.71151	
VegetableRadish	-0.02092	0.38900	-0.054	0.95711	
Time0	-0.11360	0.38566	-0.295	0.76832	
Time7	0.71795	0.36437	1.970	0.04879	*

Time28	0.33353	0.37078	0.900	0.36837	
Time42	1.02108	0.35158	2.904	0.00368	**
Time56	0.81953	0.36171	2.266	0.02347	*
Time90	-1.86401	0.58059	-3.211	0.00132	**
Time120	-0.47167	0.40058	-1.177	0.23901	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Number of iterations in BFGS optimization: 38

Log-likelihood: -1.269e+04 on 34 Df

Table A.3. Treatment*Vegetable | Treatment + Vegetable ZIP Model

Call:

```
zeroinfl(formula = new.C$Colonies.Counted ~ offset(new.C.dilution) + new.C.trt *
new.C.veg | new.C.trt +
new.C.veg, data = new.C)
```

Pearson residuals:

Min	1Q	Median	3Q	Max
-1.7507	-1.3682	-1.1340	0.6364	427.6194

Count model coefficients (poisson with log link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	9.40742	0.02680	350.982	< 2e-16

new.C.trtCompost without ABX	0.58765	0.03516	16.713	< 2e-16

new.C.trtCompost with ABX	0.10849	0.03742	2.899	0.00374
**				
new.C.trtManure with ABX	0.33455	0.03494	9.576	< 2e-16

new.C.vegRadish	-0.24792	0.04104	-6.042	1.53e-09

new.C.trtCompost without ABX:new.C.vegRadish	-0.30372	0.05569	-5.453	4.94e-08

new.C.trtCompost with ABX:new.C.vegRadish	-0.45694	0.06094	-7.499	6.45e-14

new.C.trtManure with ABX:new.C.vegRadish	-0.55982	0.05642	-9.922	< 2e-16

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-0.58491	0.19634	-2.979	0.00289 **
new.C.trtCompost without ABX	-0.44993	0.25506	-1.764	0.07772 .
new.C.trtCompost with ABX	-0.37268	0.25335	-1.471	0.14128
new.C.trtManure with ABX	-0.55915	0.25880	-2.161	0.03073 *
new.C.vegRadish	0.08799	0.18414	0.478	0.63276

signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Number of iterations in BFGS optimization: 19

Log-likelihood: -2.393e+04 on 13 Df

Table A.4. Treatment + Vegetable + Time | Treatment + Vegetable + Time ZIP Model Call:

```
zeroinfl(formula = new.C$Colonies.Counted ~ offset(new.C.dilution) +
new.C.trt + new.C.veg + Time |
new.C.trt + new.C.veg + Time, data = new.C)
```

Pearson residuals:

Min	1Q	Median	3Q	Max
-3.6411	-1.2032	-0.8982	0.2406	173.4152

Count model coefficients (poisson with log link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	6.30788	0.07008	90.014	< 2e-16 ***
new.C.trtCompost without ABX	0.08924	0.02746	3.249	0.00116 **
new.C.trtCompost with ABX	-0.22493	0.02950	-7.626	2.42e-14 ***
new.C.trtManure with ABX	0.14288	0.02753	5.191	2.10e-07 ***
new.C.vegRadish	-0.51304	0.02052	-25.002	< 2e-16 ***
Time0	3.15430	0.07996	39.446	< 2e-16 ***
Time7	2.28163	0.09968	22.891	< 2e-16 ***
Time28	2.67733	0.08795	30.441	< 2e-16 ***
Time42	4.64696	0.07228	64.293	< 2e-16 ***
Time56	4.33036	0.07298	59.332	< 2e-16 ***
Time90	4.55979	0.07015	65.001	< 2e-16 ***
Time120	4.91471	0.06978	70.434	< 2e-16 ***

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-0.68718	0.33125	-2.074	0.03803 *
new.C.trtCompost without ABX	-0.50979	0.27111	-1.880	0.06005 .
new.C.trtCompost with ABX	-0.44004	0.27122	-1.622	0.10471
new.C.trtManure with ABX	-0.59972	0.27188	-2.206	0.02739 *
new.C.vegRadish	0.06645	0.19526	0.340	0.73361
Time0	-0.14830	0.39507	-0.375	0.70738
Time7	0.57002	0.37698	1.512	0.13051
Time28	0.26007	0.37969	0.685	0.49337
Time42	0.87299	0.36726	2.377	0.01745 *
Time56	0.78364	0.36903	2.123	0.03371 *
Time90	-1.81723	0.58632	-3.099	0.00194 **
Time120	-0.58644	0.42302	-1.386	0.16565

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Number of iterations in BFGS optimization: 31

Log-likelihood: -1.277e+04 on 24 Df

APPENDIX B. Zero-Inflated Poisson Model Outputs for Ceftazidime- Resistant

Fecal Coliform Analyses

Table B.1. Treatment*Time | Treatment + Time ZIP Model

Call:

```
zeroinfl(formula = CF_colony_count ~ offset(CF_dilution) + Treatment * Time
| Treatment + Time, data = CF)
```

Pearson residuals:

Min	1Q	Median	3Q	Max
-3.9019	-1.1955	-0.6651	0.4118	16.1855

Count model coefficients (poisson with log link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	6.6174	1.0251	6.455	1.08e-10

TreatmentFertilizer Control	1.6153	1.0445	1.546	0.12199
TreatmentCompost without ABX	1.6421	1.1502	1.428	0.15342
TreatmentCompost with ABX	-10.7940	170.3695	-0.063	0.94948
TreatmentManure with ABX	1.6613	1.1446	1.451	0.14668
Time0	1.4496	1.0270	1.411	0.15810
Time7	-0.4207	1.1781	-0.357	0.72099
Time28	2.7107	1.0359	2.617	0.00887 **
Time42	-0.1065	1.1890	-0.090	0.92862
Time56	0.2954	1.1214	0.263	0.79224
Time90	3.2717	1.0286	3.181	0.00147 **
Time120	1.3243	1.0453	1.267	0.20522
TreatmentFertilizer Control:Time0	-2.9418	1.0507	-2.800	0.00511 **
TreatmentCompost without ABX:Time0	-1.9052	1.1534	-1.652	0.09858 .
TreatmentCompost with ABX:Time0	11.4005	170.3695	0.067	0.94665
TreatmentManure with ABX:Time0	-0.4407	1.1466	-0.384	0.70070
TreatmentFertilizer Control:Time7	-1.3214	1.2571	-1.051	0.29319
TreatmentCompost without ABX:Time7	0.6190	1.2964	0.477	0.63304
TreatmentCompost with ABX:Time7	10.2054	170.3715	0.060	0.95223
TreatmentManure with ABX:Time7	1.1724	1.2861	0.912	0.36201
TreatmentFertilizer Control:Time28	-1.8709	1.0628	-1.760	0.07835 .
TreatmentCompost without ABX:Time28	-2.9806	1.1739	-2.539	0.01111 *
TreatmentCompost with ABX:Time28	10.2790	170.3696	0.060	0.95189
TreatmentManure with ABX:Time28	-1.2538	1.1566	-1.084	0.27836
TreatmentFertilizer Control:Time42	2.3080	1.2068	1.912	0.05582 .
TreatmentCompost without ABX:Time42	1.7182	1.3003	1.321	0.18638
TreatmentCompost with ABX:Time42	13.4062	170.3707	0.079	0.93728

TreatmentManure with ABX:Time42	1.8231	1.2949	1.408	0.15914
TreatmentFertilizer Control:Time56	1.5616	1.1408	1.369	0.17104
TreatmentCompost without ABX:Time56	1.1788	1.2384	0.952	0.34118
TreatmentCompost with ABX:Time56	14.9543	170.3701	0.088	0.93006
TreatmentManure with ABX:Time56	1.1371	1.2357	0.920	0.35750
TreatmentFertilizer Control:Time90	-0.5526	1.0484	-0.527	0.59815
TreatmentCompost without ABX:Time90	-0.1065	1.1537	-0.092	0.92648
TreatmentCompost with ABX:Time90	12.9822	170.3696	0.076	0.93926
TreatmentManure with ABX:Time90	-0.1281	1.1481	-0.112	0.91115
TreatmentFertilizer Control:Time120	-2.2950	1.0927	-2.100	0.03571 *
TreatmentCompost without ABX:Time120	1.6628	1.1688	1.423	0.15481
TreatmentCompost with ABX:Time120	13.6088	170.3697	0.080	0.93633
TreatmentManure with ABX:Time120	-0.3439	1.1657	-0.295	0.76801

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	0.58173	0.64458	0.902	0.36679
TreatmentFertilizer Control	0.01198	0.46342	0.026	0.97938
TreatmentCompost without ABX	-0.42359	0.44878	-0.944	0.34523
TreatmentCompost with ABX	-0.06693	0.45059	-0.149	0.88192
TreatmentManure with ABX	-0.36750	0.44598	-0.824	0.40993
Time0	-1.65659	0.56207	-2.947	0.00321 **
Time7	-1.14524	0.65449	-1.750	0.08015 .
Time28	-0.59556	0.54452	-1.094	0.27408
Time42	-0.64232	0.54637	-1.176	0.23975
Time56	-0.87471	0.54771	-1.597	0.11026
Time90	-3.13041	0.67609	-4.630	3.65e-06 ***
Time120	-1.87103	0.62231	-3.007	0.00264 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Number of iterations in BFGS optimization: 57

Log-likelihood: -1.023e+04 on 52 Df

Table B.2. Vegetable*Time | Vegetable + Time ZIP Model

Call:

```
zeroinfl(formula = CF_colony_count ~ offset(CF_dilution) + Vegetable
* Time | Vegetable + Time, data = CF)
```

Pearson residuals:

Min	1Q	Median	3Q	Max
-3.8938	-1.2136	-0.8005	0.1182	19.7496

Count model coefficients (poisson with log link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	6.88315	1.04225	6.604	4e-11 ***
VegetableLettuce	1.39598	1.06538	1.310	0.19009
VegetableRadish	1.29100	1.08576	1.189	0.23443
Time0	1.18384	1.04413	1.134	0.25687
Time7	-0.44908	1.19735	-0.375	0.70762
Time28	2.44496	1.05285	2.322	0.02022 *
Time42	-0.45282	1.20400	-0.376	0.70684
Time56	-0.03294	1.13934	-0.029	0.97693
Time90	3.00595	1.04572	2.875	0.00405 **
Time120	1.06187	1.06225	1.000	0.31748
VegetableLettuce:Time0	-1.28449	1.06772	-1.203	0.22897
VegetableRadish:Time0	-0.51390	1.08781	-0.472	0.63663
VegetableLettuce:Time7	0.92797	1.22155	0.760	0.44746
VegetableRadish:Time7	0.99310	1.23950	0.801	0.42301
VegetableLettuce:Time28	-2.00480	1.07907	-1.858	0.06318 .
VegetableRadish:Time28	-1.17859	1.09807	-1.073	0.28313
VegetableLettuce:Time42	2.35671	1.22481	1.924	0.05434 .
VegetableRadish:Time42	2.12836	1.24278	1.713	0.08679 .
VegetableLettuce:Time56	1.97296	1.16111	1.699	0.08928 .
VegetableRadish:Time56	2.36458	1.17981	2.004	0.04505 *
VegetableLettuce:Time90	0.20180	1.06892	0.189	0.85026
VegetableRadish:Time90	0.44405	1.08921	0.408	0.68351
VegetableLettuce:Time120	0.99407	1.08555	0.916	0.35981
VegetableRadish:Time120	1.46279	1.10537	1.323	0.18572

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	0.9145	0.5726	1.597	0.11021
VegetableLettuce	-0.1970	0.4075	-0.483	0.62884
VegetableRadish	0.1284	0.4050	0.317	0.75115
Time0	-2.1510	0.5085	-4.230	2.34e-05 ***
Time7	-0.7039	0.4893	-1.439	0.15025

Time28	-1.0604	0.4858	-2.183	0.02906	*
Time42	-1.1507	0.4920	-2.339	0.01934	*
Time56	-1.3805	0.4938	-2.796	0.00518	**
Time90	-3.6157	0.6322	-5.719	1.07e-08	***
Time120	-2.0153	0.5035	-4.003	6.26e-05	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Number of iterations in BFGS optimization: 41

Log-likelihood: -1.25e+04 on 34 Df

Table B.3. Treatment*Vegetable | Treatment + Vegetable ZIP Model

Call:

```
zeroinfl(formula = new.CF$Colonies.Counted ~ offset(new.CF.dilution) +
new.CF.trt * new.CF.veg | new.CF.trt +
new.CF.veg, data = new.CF)
```

Pearson residuals:

Min	1Q	Median	3Q	Max
-1.7450	-1.2117	-0.9642	0.5144	52.0572

Count model coefficients (poisson with log link):

	Estimate	Std. Error	z value
Pr(> z)			
(Intercept)	8.84086	0.03734	236.758
< 2e-16 ***			
new.CF.trtCompost without ABX	0.02877	0.05182	0.555
0.579			
new.CF.trtCompost with ABX	1.69110	0.04093	41.319
< 2e-16 ***			
new.CF.trtManure with ABX	0.77942	0.04508	17.288
< 2e-16 ***			
new.CF.vegRadish	0.61737	0.04746	13.009
< 2e-16 ***			
new.CF.trtCompost without ABX:new.CF.vegRadish	0.82924	0.06250	13.269
< 2e-16 ***			
new.CF.trtCompost with ABX:new.CF.vegRadish	-1.23974	0.05513	-22.485
< 2e-16 ***			
new.CF.trtManure with ABX:new.CF.vegRadish	-0.41407	0.05765	-7.183
6.84e-13 ***			

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-0.35587	0.19460	-1.829	0.06744 .
new.CF.trtCompost without ABX	-0.81383	0.26279	-3.097	0.00196 **
new.CF.trtCompost with ABX	-0.09438	0.24502	-0.385	0.70011
new.CF.trtManure with ABX	-0.80260	0.26282	-3.054	0.00226 **
new.CF.vegRadish	0.27834	0.18547	1.501	0.13343

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Number of iterations in BFGS optimization: 20

Log-likelihood: -2.13e+04 on 13 Df

Table B.4. Treatment + Vegetable + Time | Treatment + Vegetable + Time ZIP Model
Call:

```
zeroinfl(formula = new.CF$Colonies.Counted ~ offset(new.CF.dilution) +
new.CF.trt + new.CF.veg + Time |
new.CF.trt + new.CF.veg + Time, data = new.CF)
```

Pearson residuals:

	Min	1Q	Median	3Q	Max
	-5.4454	-1.3347	-0.8335	0.1641	24.7735

Count model coefficients (poisson with log link):

	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	7.96322	0.18557	42.913	< 2e-16	***
new.CF.trtCompost without ABX	0.52877	0.02867	18.443	< 2e-16	***
new.CF.trtCompost with ABX	1.03471	0.02684	38.557	< 2e-16	***
new.CF.trtManure with ABX	0.72049	0.02831	25.452	< 2e-16	***
new.CF.vegRadish	0.25048	0.01655	15.132	< 2e-16	***
Time0	-0.17381	0.18669	-0.931	0.3519	
Time7	0.03513	0.19913	0.176	0.8600	
Time28	0.33628	0.19326	1.740	0.0819	.
Time42	1.34364	0.18857	7.125	1.04e-12	***
Time56	1.63707	0.18765	8.724	< 2e-16	***
Time90	2.82888	0.18608	15.202	< 2e-16	***
Time120	1.74104	0.18722	9.299	< 2e-16	***

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	7.954e-01	4.589e-01	1.733	0.083032	.
new.CF.trtCompost without ABX	-7.826e-01	2.841e-01	-2.754	0.005883	**
new.CF.trtCompost with ABX	4.453e-05	2.689e-01	0.000	0.999868	
new.CF.trtManure with ABX	-7.598e-01	2.849e-01	-2.667	0.007652	**
new.CF.vegRadish	3.253e-01	1.994e-01	1.631	0.102793	
Time0	-1.796e+00	5.244e-01	-3.424	0.000616	***
Time7	-3.612e-01	5.075e-01	-0.712	0.476637	
Time28	-8.135e-01	5.057e-01	-1.609	0.107690	
Time42	-8.643e-01	5.053e-01	-1.710	0.087213	.
Time56	-1.105e+00	5.075e-01	-2.178	0.029442	*
Time90	-3.787e+00	7.382e-01	-5.130	2.9e-07	***
Time120	-1.640e+00	5.189e-01	-3.160	0.001580	**

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Number of iterations in BFGS optimization: 31

Log-likelihood: -1.139e+04 on 24 Df

APPENDIX C. Zero-Inflated Poisson Model Outputs for Clindamycin-Resistant Fecal Coliform Analyses

Table C.1. Treatment | Treatment ZIP Model

Call:

```
zeroinfl(formula = CL_colony_count ~ offset(CL_dilution) + Treatment | Treatment, data = CL)
```

Pearson residuals:

Min	1Q	Median	3Q	Max
-0.4577	-0.2987	-0.2423	-0.2410	40.5110

Count model coefficients (poisson with log link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	8.90585	0.05822	152.96	< 2e-16 ***
TreatmentFertilizer Control	-0.47204	0.07815	-6.04	1.54e-09 ***
TreatmentCompost without ABX	-3.31397	0.22832	-14.52	< 2e-16 ***
TreatmentCompost with ABX	-2.66029	0.14026	-18.97	< 2e-16 ***
TreatmentManure with ABX	-0.47380	0.06608	-7.17	7.49e-13 ***

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	2.833e+00	5.145e-01	5.507	3.65e-08 ***
TreatmentFertilizer Control	8.925e-06	6.301e-01	0.000	1.0000
TreatmentCompost without ABX	-2.636e-02	6.306e-01	-0.042	0.9667
TreatmentCompost with ABX	-4.373e-01	5.964e-01	-0.733	0.4634
TreatmentManure with ABX	-1.273e+00	5.596e-01	-2.275	0.0229 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Number of iterations in BFGS optimization: 21

Log-likelihood: -1316 on 10 Df

Table C.2. Vegetable | Vegetable ZIP Model

Call:

```
zeroinfl(formula = CL_colony_count ~ offset(CL_dilution) +
Vegetable | Vegetable, data = CL)
```

Pearson residuals:

Min	1Q	Median	3Q	Max
-0.3210	-0.3210	-0.3145	-0.3098	73.9990

Count model coefficients (poisson with log link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	8.90585	0.05822	152.96	<2e-16 ***
VegetableLettuce	-1.01866	0.06914	-14.73	<2e-16 ***
VegetableRadish	-0.81977	0.06864	-11.94	<2e-16 ***

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	2.8332	0.5145	5.507	3.65e-08 ***
VegetableLettuce	-0.5645	0.5528	-1.021	0.307
VegetableRadish	-0.5230	0.5541	-0.944	0.345

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Number of iterations in BFGS optimization: 14

Log-likelihood: -1780 on 6 Df

Table C.3. Time | Time ZIP Model

CLmodwk2 <- update(CLmodwk, .~offset(CL_dilution)+Time Time, da ta=CL)
Error in solve.default(as.matrix(fit\$hessian)) : system is computationally singular: reciprocal condition number = 1.63529e-22

Table C.4. Treatment + Vegetable | Treatment + Vegetable ZIP Model

Call:

```
zeroinfl(formula = new.CL$Colonies.Counted ~ offset(new.CL.dilution) + new.CL.trt *
new.CL.veg | new.CL.trt +
new.CL.veg, data = new.CL)
```

Pearson residuals:

Min	1Q	Median	3Q	Max
-0.4667	-0.3041	-0.2473	-0.2391	40.2431

Count model coefficients (poisson with log link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	4.8598	0.5109	9.513	< 2e-16

new.CL.trtCompost without ABX	-0.6070	0.9815	-0.618	0.5363
new.CL.trtCompost with ABX	1.2623	0.5410	2.333	0.0196
*				
new.CL.trtManure with ABX	3.5608	0.5123	6.950	3.64e-12

new.CL.vegRadish	4.0330	0.5136	7.853	4.06e-15

new.CL.trtCompost without ABX:new.CL.vegRadish	-2.4860	1.0084	-2.465	0.0137
*				
new.CL.trtCompost with ABX:new.CL.vegRadish	-3.7592	0.5735	-6.555	5.58e-11

new.CL.trtManure with ABX:new.CL.vegRadish	-3.9987	0.5178	-7.722	1.14e-14

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	2.78119	0.39147	7.104	1.21e-12 ***
new.CL.trtCompost without ABX	-0.09711	0.52035	-0.187	0.85195
new.CL.trtCompost with ABX	-0.42435	0.47283	-0.897	0.36946
new.CL.trtManure with ABX	-1.25991	0.42547	-2.961	0.00306 **
new.CL.vegRadish	0.07895	0.29376	0.269	0.78813

signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

APPENDIX D. Zero-Inflated Poisson Model Outputs for Erythromycin-Resistant Fecal Coliform Analyses

Table D.1. Treatment*Time | Treatment + Time ZIP Model

Call:

```
zeroinfl(formula = E_colony_count ~ offset(E_dilution) + Treatment * Time | Treatment + Time, data = E)
```

Pearson residuals:

	Min	1Q	Median	3Q	Max
	-2.7316849	-0.3316730	-0.0003637	-0.0002669	16.6561984

Count model coefficients (poisson with log link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-1.406e+01	1.249e+03	-0.011	0.991
TreatmentFertilizer Control	1.339e+00	1.577e+03	0.001	0.999
TreatmentCompost without ABX	1.945e+00	1.516e+03	0.001	0.999
TreatmentCompost with ABX	1.758e+00	1.555e+03	0.001	0.999
TreatmentManure with ABX	1.725e+01	1.249e+03	0.014	0.989
Time0	1.210e+00	2.411e+03	0.001	1.000
Time7	8.418e-02	1.728e+03	0.000	1.000
Time28	1.424e+01	1.249e+03	0.011	0.991
Time42	3.075e-01	1.656e+03	0.000	1.000
Time56	5.146e-01	1.597e+03	0.000	1.000
Time90	8.096e-01	1.504e+03	0.001	1.000
Time120	2.111e+01	1.249e+03	0.017	0.987
TreatmentFertilizer Control:Time0	-4.698e-05	2.726e+03	0.000	1.000
TreatmentCompost without ABX:Time0	1.690e+01	2.560e+03	0.007	0.995
TreatmentCompost with ABX:Time0	1.874e+01	2.583e+03	0.007	0.994
TreatmentManure with ABX:Time0	2.608e+00	2.411e+03	0.001	0.999
TreatmentFertilizer Control:Time7	-3.553e-05	2.173e+03	0.000	1.000
TreatmentCompost without ABX:Time7	2.303e+00	2.089e+03	0.001	0.999
TreatmentCompost with ABX:Time7	1.648e+01	1.960e+03	0.008	0.993
TreatmentManure with ABX:Time7	3.894e+00	1.728e+03	0.002	0.998
TreatmentFertilizer Control:Time28	3.840e+00	1.577e+03	0.002	0.998
TreatmentCompost without ABX:Time28	1.891e+00	1.516e+03	0.001	0.999
TreatmentCompost with ABX:Time28	-1.180e+01	1.747e+03	-0.007	0.995
TreatmentManure with ABX:Time28	-1.360e+01	1.249e+03	-0.011	0.991
TreatmentFertilizer Control:Time42	-3.384e-05	2.132e+03	0.000	1.000
TreatmentCompost without ABX:Time42	1.545e+01	1.866e+03	0.008	0.993
TreatmentCompost with ABX:Time42	-3.724e-05	2.102e+03	0.000	1.000
TreatmentManure with ABX:Time42	-6.339e-01	1.656e+03	0.000	1.000

TreatmentFertilizer Control:Time56	1.358e+01	1.866e+03	0.007	0.994
TreatmentCompost without ABX:Time56	-4.166e-05	1.999e+03	0.000	1.000
TreatmentCompost with ABX:Time56	1.446e+01	1.846e+03	0.008	0.994
TreatmentManure with ABX:Time56	-1.549e+01	1.782e+03	-0.009	0.993
TreatmentFertilizer Control:Time90	-7.012e-05	1.908e+03	0.000	1.000
TreatmentCompost without ABX:Time90	1.441e+01	1.732e+03	0.008	0.993
TreatmentCompost with ABX:Time90	-7.876e-05	1.881e+03	0.000	1.000
TreatmentManure with ABX:Time90	6.191e+00	1.504e+03	0.004	0.997
TreatmentFertilizer Control:Time120	-1.390e+00	1.577e+03	-0.001	0.999
TreatmentCompost without ABX:Time120	-3.701e+00	1.516e+03	-0.002	0.998
TreatmentCompost with ABX:Time120	-2.047e+00	1.555e+03	-0.001	0.999
TreatmentManure with ABX:Time120	-1.522e+01	1.249e+03	-0.012	0.990

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	-2.29350	1.32658	-1.729	0.083830	.
TreatmentFertilizer Control	3.67945	1.19042	3.091	0.001996	**
TreatmentCompost without ABX	4.13478	1.16360	3.553	0.000380	***
TreatmentCompost with ABX	4.08875	1.17533	3.479	0.000504	***
TreatmentManure with ABX	3.79158	1.15349	3.287	0.001012	**
Time0	-2.78413	0.77848	-3.576	0.000348	***
Time7	-0.07032	0.84387	-0.083	0.933593	
Time28	-0.19204	0.95918	-0.200	0.841315	
Time42	0.29696	0.88281	0.336	0.736586	
Time56	0.52632	1.25408	0.420	0.674712	
Time90	0.11060	0.83807	0.132	0.895008	
Time120	0.20843	0.79817	0.261	0.793986	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Number of iterations in BFGS optimization: 45

Log-likelihood: -1260 on 52 Df

Table D.2. Vegetable*Time | Vegetable + Time ZIP Model

Call:

```
zeroinfl(formula = E_colony_count ~ offset(E_dilution) +
Vegetable * Time | Vegetable + Time, data = E)
```

Pearson residuals:

Min	1Q	Median	3Q	Max
-2.7330384	-0.3683630	-0.1684311	-0.0007095	26.2323414

Count model coefficients (poisson with log link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-12.25800	545.36887	-0.022	0.982
VegetableLettuce	13.50292	545.37021	0.025	0.980
VegetableRadish	15.77447	545.36901	0.029	0.977
Time0	0.90437	1122.41846	0.001	0.999
Time7	0.37391	696.78069	0.001	1.000
Time28	12.45740	545.36976	0.023	0.982
Time42	-0.22136	796.34202	0.000	1.000
Time56	0.20639	747.25613	0.000	1.000
Time90	0.07299	737.80292	0.000	1.000
Time120	19.31218	545.36887	0.035	0.972
VegetableLettuce:Time0	5.25529	1122.41912	0.005	0.996
VegetableRadish:Time0	1.66625	1122.41854	0.001	0.999
VegetableLettuce:Time7	1.34811	696.78620	0.002	0.998
VegetableRadish:Time7	2.66013	696.78083	0.004	0.997
VegetableLettuce:Time28	-8.40991	545.37111	-0.015	0.988
VegetableRadish:Time28	-13.76163	545.37277	-0.025	0.980
VegetableLettuce:Time42	2.08179	796.34301	0.003	0.998
VegetableRadish:Time42	-13.66544	846.75145	-0.016	0.987
VegetableLettuce:Time56	0.02912	747.25801	0.000	1.000
VegetableRadish:Time56	-1.07537	747.25679	-0.001	0.999
VegetableLettuce:Time90	6.84385	737.80391	0.009	0.993
VegetableRadish:Time90	-13.66565	774.30031	-0.018	0.986
VegetableLettuce:Time120	-13.25505	545.37022	-0.024	0.981
VegetableRadish:Time120	-15.03359	545.36902	-0.028	0.978

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-1.3068	1.3094	-0.998	0.318298
VegetableLettuce	3.8284	1.1296	3.389	0.000701 ***
VegetableRadish	3.9996	1.1351	3.524	0.000426 ***
Time0	-2.8459	0.7275	-3.912	9.16e-05 ***
Time7	-0.4780	0.9225	-0.518	0.604320

Time28	-1.0024	0.9272	-1.081	0.279650
Time42	-0.5709	0.9433	-0.605	0.545040
Time56	0.3138	1.1335	0.277	0.781886
Time90	-0.6970	0.9052	-0.770	0.441257
Time120	-0.7794	0.7696	-1.013	0.311245

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Number of iterations in BFGS optimization: 37

Log-likelihood: -3087 on 34 Df

Table D.3. Treatment*Vegetable | Treatment + Vegetable ZIP Model

Call:

```
zeroinfl(formula = new.E$Colonies.Counted ~ offset(new.E.dilution) + new.E.trt *
new.E.veg | new.E.trt +
new.E.veg, data = new.E)
```

Pearson residuals:

Min	1Q	Median	3Q	Max
-0.5641	-0.4169	-0.3347	-0.2204	36.7341

Count model coefficients (poisson with log link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	4.8794	0.1234	39.551	<2e-16

new.E.trtCompost without ABX	-0.2312	0.1996	-1.159	0.247
new.E.trtCompost with ABX	3.1780	0.1405	22.617	<2e-16

new.E.trtManure with ABX	2.7152	0.1270	21.387	<2e-16

new.E.vegRadish	3.5830	0.1492	24.014	<2e-16

new.E.trtCompost without ABX:new.E.vegRadish	-2.3842	0.2898	-8.228	<2e-16

new.E.trtCompost with ABX:new.E.vegRadish	-6.3327	0.2279	-27.782	<2e-16

new.E.trtManure with ABX:new.E.vegRadish	-5.6251	0.1930	-29.144	<2e-16

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	2.6331	0.3801	6.928	4.26e-12 ***
new.E.trtCompost without ABX	-1.0643	0.4388	-2.426	0.015280 *
new.E.trtCompost with ABX	-0.8871	0.4439	-1.999	0.045647 *
new.E.trtManure with ABX	-1.4946	0.4190	-3.567	0.000361 ***
new.E.vegRadish	0.3890	0.2534	1.535	0.124788

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Number of iterations in BFGS optimization: 25

Log-likelihood: -3016 on 13 Df

Table D.4. Treatment + Vegetable + Time | Treatment + Vegetable + Time ZIP Model Call:

```
zeroinfl(formula = new.E$Colonies.Counted ~ offset(new.E.dilution) +
new.E.trt + new.E.veg + Time |
new.E.trt + new.E.veg + Time, data = new.E)
```

Pearson residuals:

Min	1Q	Median	3Q	Max
-1.3497	-0.3413	-0.1884	-0.1017	40.9574

Count model coefficients (poisson with log link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	1.97839	0.41740	4.740	2.14e-06 ***
new.E.trtCompost without ABX	-2.89168	0.16376	-17.658	< 2e-16 ***
new.E.trtCompost with ABX	1.19201	0.11846	10.062	< 2e-16 ***
new.E.trtManure with ABX	1.45429	0.10678	13.619	< 2e-16 ***
new.E.vegRadish	-0.42549	0.07964	-5.343	9.15e-08 ***
Time0	4.28217	0.40671	10.529	< 2e-16 ***
Time7	3.39982	0.44542	7.633	2.30e-14 ***
Time28	3.18392	0.42988	7.407	1.30e-13 ***
Time42	-0.05591	0.54320	-0.103	0.918
Time56	0.07563	0.84783	0.089	0.929
Time90	6.68310	0.40602	16.460	< 2e-16 ***
Time120	5.18221	0.40993	12.642	< 2e-16 ***

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	3.6880	0.7668	4.810	1.51e-06 ***
new.E.trtCompost without ABX	-2.2701	0.5625	-4.036	5.45e-05 ***
new.E.trtCompost with ABX	-1.0348	0.5032	-2.056	0.039759 *
new.E.trtManure with ABX	-1.8359	0.4889	-3.755	0.000173 ***
new.E.vegRadish	0.4258	0.3054	1.394	0.163239
Time0	-3.0764	0.6965	-4.417	1.00e-05 ***
Time7	-0.3594	0.7908	-0.455	0.649450
Time28	-0.6842	0.7542	-0.907	0.364327
Time42	-0.2830	0.8363	-0.338	0.735068
Time56	0.4646	0.9876	0.470	0.638027
Time90	0.2777	0.8051	0.345	0.730166
Time120	-0.5348	0.7382	-0.724	0.468802

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Number of iterations in BFGS optimization: 32

Log-likelihood: -1112 on 24 Df

APPENDIX E. Zero-Inflated Poisson Model R Code for Total Fecal Coliform

Analyses (Corresponding with Outputs from A.1-A.4)

```
C <- read.csv("Control 3_9_2017.csv")
#releveling factors
C$Treatment <- factor(C$Treatment,
  c("No Amendment Control", "Fertilizer Control", "Compost without
  ABX", "Compost with ABX", "Manure with ABX"))
C$Vegetable <- factor(C$Vegetable,
  c("None", "Lettuce", "Radish"))
C$Time <- factor(C$Time,
  c("-1", "0", "7", "28", "42", "56", "90", "120"))
colony_count <- C$Colonies.Counted #Colony Count
dilution <- -log(C$Dilution.Factor) #Dilution factor
#model with offset
modwk <- zeroinfl(colony_count~offset(dilution)+Treatment*Time|Treatment+Time,
  data=C)
summary(modwk) #A.1
modwk1 <- update(modwk,~offset(dilution)+Vegetable*Time|Vegetable+Time,data=C)
summary(modwk1) #A.2
#not accounting for dilution
mwk2 <- zeroinfl(CFU.E..coli..g.soil~Treatment+Time|Treatment+Time,data=C)
summary(mwk2)
#Significance of the model
pchisq(2*(logLik(modwk)-logLik(modwk1)),df=(8-1)*(5-1),lower.tail=FALSE)
#0.000805649

new.C <- C[which(C$Vegetable!="None"&C$Treatment!="No Amendment Control"),]
summary(new.C)
new.C.trt <- factor(new.C$Treatment,levels=c("Fertilizer Control", "Compost without
  ABX", "Compost with ABX", "Manure with ABX"))
new.C.veg <- factor(new.C$Vegetable, levels=c("Lettuce","Radish"))
new.C.dilution <- -log(new.C$Dilution.Factor) #Dilution Factor
new.C.ZIP <-
  zeroinfl(new.C$Colonies.Counted~offset(new.C.dilution)+new.C.trt*new.C.veg|new.C.tr
  t*new.C.veg,data=new.C)
summary(new.C.ZIP) #A.3
new.C.ZIP.1 <-
  zeroinfl(new.C$Colonies.Counted~offset(new.C.dilution)+new.C.trt+new.C.veg+Time|n
  ew.C.trt+new.C.veg+Time,data=new.C)
summary(new.C.ZIP.1) #A.4
```

APPENDIX F. Zero-Inflated Poisson Model R Code for Ceftazidime- Resistant Fecal Coliform Analyses (Corresponding with Outputs from B.1-B.4)

```

CF <- read.csv("CF 3_13_2017.csv")
summary(CF)
#releveling factors
CF$Treatment <- factor(CF$Treatment,
                        c("No Amendment Control", "Fertilizer Control", "Compost without ABX",
                          "Compost with ABX", "Manure with ABX"))
CF$Vegetable <- factor(CF$Vegetable,
                       c("None", "Lettuce", "Radish"))
CF$Time <- factor(CF$Time,
                  c("-1", "0", "7", "28", "42", "56", "90", "120"))
CF_colony_count <- CF$Colonies.Counted #Colony Count
CF_dilution <- -log(CF$Dilution.Factor) #Dilution factor
#model with offset
CFmodwk <-
zeroinfl(CF_colony_count~offset(CF_dilution)+Treatment*Time|Treatment+Time,
data=CF)
summary(CFmodwk) #B.1
CFmodwk1 <-
update(CFmodwk,~offset(CF_dilution)+Vegetable*Time|Vegetable+Time,data=CF)
summary(CFmodwk1) #B.2
#Significance of the model
pchisq(2*(logLik(CFmodwk)-logLik(CFmodwk1)),df=(8-1)*(5-1),lower.tail=FALSE)
#0.000805649

new.CF <- CF[which(CF$Vegetable!="None"&CF$Treatment!="No Amendment
Control"),]
summary(new.CF)
new.CF.trt <- factor(new.CF$Treatment,levels=c("Fertilizer Control", "Compost without
ABX", "Compost with ABX", "Manure with ABX"))
new.CF.veg <- factor(new.CF$Vegetable, levels=c("Lettuce","Radish"))
new.CF.dilution <- -log(new.CF$Dilution.Factor) #Dilution Factor

new.CF.ZIP <-
zeroinfl(new.CF$Colonies.Counted~offset(new.CF.dilution)+new.CF.trt*new.CF.veg|ne
w.CF.trt+new.CF.veg,data=new.CF)
summary(new.CF.ZIP) #B.3
new.CF.ZIP.1 <-
zeroinfl(new.CF$Colonies.Counted~offset(new.CF.dilution)+new.CF.trt+new.CF.veg+Ti
me|new.CF.trt+new.CF.veg+Time,data=new.CF)
summary(new.CF.ZIP.1) #B.4

```

APPENDIX G. Zero-Inflated Poisson Model R Code for Clindamycin- Resistant Fecal Coliform Analyses (Corresponding with Outputs from C.1-C.4)

```
CL <- read.csv("CL 3_13_2017.csv")
summary(CL)
#releveling factors
CL$Treatment <- factor(CL$Treatment,
  c("No Amendment Control", "Fertilizer Control", "Compost without
  ABX", "Compost with ABX", "Manure with ABX"))
CL$Vegetable <- factor(CL$Vegetable,
  c("None", "Lettuce", "Radish"))
CL$Time <- factor(CL$Time,
  c("-1", "0", "7", "28", "42", "56", "90", "120"))
CL_colony_count <- CL$Colonies.Counted #Colony Count
CL_dilution <- -log(CL$Dilution.Factor) #Dilution factor
#model with offset
CLmodwk <- zeroinfl(CL_colony_count~offset(CL_dilution)+Treatment |Treatment,
  data=CL)
summary(CLmodwk) #C.1
CLmodwk1 <- update(CLmodwk,~offset(CL_dilution)+Vegetable | Vegetable,data=CL)
summary(CLmodwk1) #C.2
CLmodwk2 <- update(CLmodwk,~offset(CL_dilution)+Time|Time,data=CL)
summary(CLmodwk2) #C.3
#Significance of the model
pchisq(2*(logLik(CLmodwk)-logLik(CLmodwk1)),df=(8-1)*(5-1),lower.tail=FALSE)
#0.000805649

new.CL <- CL[which(CL$Vegetable!="None"&CL$Treatment!="No Amendment
  Control"),]
summary(new.CL)
new.CL.trt <- factor(new.CL$Treatment,levels=c("Fertilizer Control", "Compost without
  ABX", "Compost with ABX", "Manure with ABX"))
new.CL.veg <- factor(new.CL$Vegetable, levels=c("Lettuce","Radish"))
new.CL.dilution <- -log(new.CL$Dilution.Factor) #dilution factor

new.CL.ZIP <-
  zeroinfl(new.CL$Colonies.Counted~offset(new.CL.dilution)+new.CL.trt*new.CL.veg|ne
  w.CL.trt+new.CL.veg,data=new.CL)
summary(new.CL.ZIP) #C.4
```

APPENDIX H. Zero-Inflated Poisson Model R Code for Erythromycin-Resistant Fecal Coliform Analyses (Corresponding with Outputs from E.1-E.4)

```

E <- read.csv("E 3_13_2017.csv")
summary(E)
#releveling factors
E$Treatment <- factor(E$Treatment,
                      c("No Amendment Control", "Fertilizer Control", "Compost without
ABX", "Compost with ABX", "Manure with ABX"))
E$Vegetable <- factor(E$Vegetable,
                     c("None", "Lettuce", "Radish"))
E$Time <- factor(E$Time,
                 c("-1", "0", "7", "28", "42", "56", "90", "120"))
E_colony_count <- E$Colonies.Counted #Colony Count
E_dilution <- -log(E$Dilution.Factor) #Dilution factor
#model with offset
Emodwk3 <-
zeroinfl(E_colony_count~offset(E_dilution)+Treatment*Time|Treatment+Time, data=E)
summary(Emodwk3) #D.1
Emodwk2 <-
update(Emodwk,~offset(E_dilution)+Vegetable*Time|Vegetable+Time,data=E)
summary(Emodwk2) #D.2
#Significance of the model
pchisq(2*(logLik(CLmodwk)-logLik(CLmodwk1)),df=(8-1)*(5-1),lower.tail=FALSE)
#0.000805649

new.E <- E[which(E$Vegetable!="None"&E$Treatment!="No Amendment Control"),]
summary(new.E)
new.E.trt <- factor(new.E$Treatment,levels=c("Fertilizer Control", "Compost without
ABX", "Compost with ABX", "Manure with ABX"))
new.E.veg <- factor(new.E$Vegetable, levels=c("Lettuce","Radish"))
new.E.dilution <- -log(new.E$Dilution.Factor) #Colony Counts

new.E.ZIP <-
zeroinfl(new.E$Colonies.Counted~offset(new.E.dilution)+new.E.trt*new.E.veg|new.E.trt
+new.E.veg,data=new.E)
summary(new.E.ZIP) #D.3

new.E.ZIP.1 <-
zeroinfl(new.E$Colonies.Counted~offset(new.E.dilution)+new.E.trt+new.E.veg+Time|ne
w.E.trt+new.E.veg+Time,data=new.E)
summary(new.E.ZIP.1) #D.4

```

APPENDIX I. Raw Data: Colony Counts from No Antibiotic Control MacConkey Agar Plates for entire study.

Table I.1. Colony counts, dilution, and CFU's for Day -1, 0, 7, 28, 42, 56, 90, and 120 No Antibiotic Control Plates.

Treatment	Time	Vegetable	Colonies Counted	Dilution Factor	CFU E. coli/ g soil	log10 CFU E. coli/ g soil	Censored CFU
No Amendment Control	-1	None	6	100	600	2.77815125	FALSE
No Amendment Control	-1	None	1	100	100	2	FALSE
No Amendment Control	-1	None	0	100	0	0	TRUE
Fertilizer Control	-1	Radish	1	100	100	2	FALSE
Fertilizer Control	-1	Lettuce	3	100	300	2.477121255	FALSE
Fertilizer Control	-1	Radish	5	100	500	2.698970004	FALSE
Fertilizer Control	-1	Lettuce	0	100	0	0	FALSE
Fertilizer Control	-1	Radish	7	100	700	2.84509804	FALSE
Fertilizer Control	-1	Lettuce	2	100	200	2.301029996	FALSE
Compost without ABX	-1	Radish	1	100	100	2	FALSE
Compost without ABX	-1	Lettuce	1	100	100	2	FALSE
Compost without ABX	-1	Radish	0	100	0	0	TRUE
Compost without ABX	-1	Lettuce	0	100	0	0	TRUE
Compost without ABX	-1	Radish	0	100	0	0	TRUE
Compost without ABX	-1	Lettuce	3	100	300	2.477121255	FALSE
Compost with ABX	-1	Radish	2	100	200	2.301029996	FALSE
Compost with ABX	-1	Lettuce	2	100	200	2.301029996	FALSE
Compost with ABX	-1	Radish	0	100	0	0	TRUE
Compost with ABX	-1	Lettuce	0	100	0	0	TRUE
Compost with ABX	-1	Radish	2	100	200	2.301029996	FALSE
Compost with ABX	-1	Lettuce	0	100	0	0	TRUE
Manure with ABX	-1	Radish	2	100	200	2.301029996	FALSE
Manure with ABX	-1	Lettuce	7	100	700	2.84509804	FALSE

Manure with ABX	-1	Radish	13	100	1300	3.113943352	FALSE
Manure with ABX	-1	Lettuce	0	100	0	0	TRUE
Manure with ABX	-1	Radish	2	100	200	2.301029996	FALSE
Manure with ABX	-1	Lettuce	12	100	1200	3.079181246	FALSE
No Amendment Control	-1	None	1	100	100	2	FALSE
No Amendment Control	-1	None	1	100	100	2	FALSE
No Amendment Control	-1	None	4	100	400	2.602059991	FALSE
Fertilizer Control	-1	Radish	1	100	100	2	FALSE
Fertilizer Control	-1	Lettuce	1	100	100	2	FALSE
Fertilizer Control	-1	Radish	0	100	0	0	TRUE
Fertilizer Control	-1	Lettuce	2	100	200	2.301029996	FALSE
Fertilizer Control	-1	Radish	4	100	400	2.602059991	FALSE
Fertilizer Control	-1	Lettuce	3	100	300	2.477121255	FALSE
Compost without ABX	-1	Radish	1	100	100	2	FALSE
Compost without ABX	-1	Lettuce	2	100	200	2.301029996	FALSE
Compost without ABX	-1	Radish	0	100	0	0	TRUE
Compost without ABX	-1	Lettuce	0	100	0	0	TRUE
Compost without ABX	-1	Radish	0	100	0	0	TRUE
Compost without ABX	-1	Lettuce	0	100	0	0	TRUE
Compost with ABX	-1	Radish	2	100	200	2.301029996	FALSE
Compost with ABX	-1	Lettuce	3	100	300	2.477121255	FALSE
Compost with ABX	-1	Radish	9	100	900	2.954242509	FALSE
Compost with ABX	-1	Lettuce	0	100	0	0	TRUE
Compost with ABX	-1	Radish	4	100	400	2.602059991	FALSE
Compost with ABX	-1	Lettuce	1	100	100	2	FALSE
Manure with ABX	-1	Radish	5	100	500	2.698970004	FALSE
Manure with ABX	-1	Lettuce	4	100	400	2.602059991	FALSE

Manure with ABX	-1	Radish	22	100	2200	3.342422681	FALSE
Manure with ABX	-1	Lettuce	2	100	200	2.301029996	FALSE
Manure with ABX	-1	Radish	7	100	700	2.84509804	FALSE
Manure with ABX	-1	Lettuce	2	100	200	2.301029996	FALSE
No Amendment Control	-1	None	3	100	300	2.477121255	FALSE
No Amendment Control	-1	None	3	100	300	2.477121255	FALSE
No Amendment Control	-1	None	0	100	0	0	TRUE
Fertilizer Control	-1	Radish	0	100	0	0	TRUE
Fertilizer Control	-1	Lettuce	1	100	100	2	FALSE
Fertilizer Control	-1	Radish	4	100	400	2.602059991	FALSE
Fertilizer Control	-1	Lettuce	1	100	100	2	FALSE
Fertilizer Control	-1	Radish	11	100	1100	3.041392685	FALSE
Fertilizer Control	-1	Lettuce	4	100	400	2.602059991	FALSE
Compost without ABX	-1	Radish	4	100	400	2.602059991	FALSE
Compost without ABX	-1	Lettuce	1	100	100	2	FALSE
Compost without ABX	-1	Radish	1	100	100	2	FALSE
Compost without ABX	-1	Lettuce	0	100	0	0	TRUE
Compost without ABX	-1	Radish	0	100	0	0	TRUE
Compost without ABX	-1	Lettuce	0	100	0	0	TRUE
Compost with ABX	-1	Radish	2	100	200	2.301029996	FALSE
Compost with ABX	-1	Lettuce	10	100	1000	3	FALSE
Compost with ABX	-1	Radish	0	100	0	0	TRUE
Compost with ABX	-1	Lettuce	5	100	500	2.698970004	FALSE
Compost with ABX	-1	Radish	6	100	600	2.77815125	FALSE
Compost with ABX	-1	Lettuce	1	100	100	2	FALSE
Manure with ABX	-1	Radish	2	100	200	2.301029996	FALSE
Manure with ABX	-1	Lettuce	6	100	600	2.77815125	FALSE

Manure with ABX	-1	Radish	22	100	2200	3.342422681	FALSE
Manure with ABX	-1	Lettuce	0	100	0	0	TRUE
Manure with ABX	-1	Radish	5	100	500	2.698970004	FALSE
Manure with ABX	-1	Lettuce	6	100	600	2.77815125	FALSE
No Amendment Control	0	None	1	1000	1000	3	FALSE
No Amendment Control	0	None	0	1000	0	0	TRUE
No Amendment Control	0	None	1	1000	1000	3	FALSE
Fertilizer Control	0	Radish	1	1000	1000	3	FALSE
Fertilizer Control	0	Lettuce	3	1000	3000	3.477121255	FALSE
Fertilizer Control	0	Radish	11	1000	11000	4.041392685	FALSE
Fertilizer Control	0	Lettuce	1	1000	1000	3	FALSE
Fertilizer Control	0	Radish	0	1000	0	0	TRUE
Fertilizer Control	0	Lettuce	0	1000	0	0	TRUE
Compost without ABX	0	Radish	1	1000	1000	3	FALSE
Compost without ABX	0	Lettuce	3	1000	3000	3.477121255	FALSE
Compost without ABX	0	Radish	11	1000	11000	4.041392685	FALSE
Compost without ABX	0	Lettuce	0	1000	0	0	TRUE
Compost without ABX	0	Radish	3	1000	3000	3.477121255	FALSE
Compost without ABX	0	Lettuce	2	1000	2000	3.301029996	FALSE
Compost with ABX	0	Radish	0	1000	0	0	TRUE
Compost with ABX	0	Lettuce	7	1000	7000	3.84509804	FALSE
Compost with ABX	0	Radish	4	1000	4000	3.602059991	FALSE
Compost with ABX	0	Lettuce	2	1000	2000	3.301029996	FALSE
Compost with ABX	0	Radish	8	1000	8000	3.903089987	FALSE
Compost with ABX	0	Lettuce	23	1000	23000	4.361727836	FALSE
Manure with ABX	0	Radish	1	1000	1000	3	FALSE
Manure with ABX	0	Lettuce	1	1000	1000	3	FALSE

Manure with ABX	0	Radish	1	1000	1000	3	FALSE
Manure with ABX	0	Lettuce	0	1000	0	0	TRUE
Manure with ABX	0	Radish	104	1000	104000	5.017033339	FALSE
Manure with ABX	0	Lettuce	0	1000	0	0	TRUE
No Amendment Control	0	None	1	1000	1000	3	FALSE
No Amendment Control	0	None	0	1000	0	0	TRUE
No Amendment Control	0	None	1	1000	1000	3	FALSE
Fertilizer Control	0	Radish	2	1000	2000	3.301029996	FALSE
Fertilizer Control	0	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	0	Radish	4	1000	4000	3.602059991	FALSE
Fertilizer Control	0	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	0	Radish	1	1000	1000	3	FALSE
Fertilizer Control	0	Lettuce	0	1000	0	0	TRUE
Compost without ABX	0	Radish	1	1000	1000	3	FALSE
Compost without ABX	0	Lettuce	2	1000	2000	3.301029996	FALSE
Compost without ABX	0	Radish	7	1000	7000	3.84509804	FALSE
Compost without ABX	0	Lettuce	1	1000	1000	3	FALSE
Compost without ABX	0	Radish	4	1000	4000	3.602059991	FALSE
Compost without ABX	0	Lettuce	2	1000	2000	3.301029996	FALSE
Compost with ABX	0	Radish	1	1000	1000	3	FALSE
Compost with ABX	0	Lettuce	3	1000	3000	3.477121255	FALSE
Compost with ABX	0	Radish	2	1000	2000	3.301029996	FALSE
Compost with ABX	0	Lettuce	2	1000	2000	3.301029996	FALSE
Compost with ABX	0	Radish	3	1000	3000	3.477121255	FALSE
Compost with ABX	0	Lettuce	31	1000	31000	4.491361694	FALSE
Manure with ABX	0	Radish	0	1000	0	0	TRUE
Manure with ABX	0	Lettuce	25	1000	25000	4.397940009	FALSE

Manure with ABX	0	Radish	1	1000	1000	3	FALSE
Manure with ABX	0	Lettuce	0	1000	0	0	TRUE
Manure with ABX	0	Radish	105	1000	105000	5.021189299	FALSE
Manure with ABX	0	Lettuce	0	1000	0	0	TRUE
No Amendment Control	0	None	5	1000	5000	3.698970004	FALSE
No Amendment Control	0	None	1	1000	1000	3	FALSE
No Amendment Control	0	None	0	1000	0	0	TRUE
Fertilizer Control	0	Radish	0	1000	0	0	TRUE
Fertilizer Control	0	Lettuce	1	1000	1000	3	FALSE
Fertilizer Control	0	Radish	3	1000	3000	3.477121255	FALSE
Fertilizer Control	0	Lettuce	1	1000	1000	3	FALSE
Fertilizer Control	0	Radish	0	1000	0	0	TRUE
Fertilizer Control	0	Lettuce	1	1000	1000	3	FALSE
Compost without ABX	0	Radish	1	1000	1000	3	FALSE
Compost without ABX	0	Lettuce	1	1000	1000	3	FALSE
Compost without ABX	0	Radish	4	1000	4000	3.602059991	FALSE
Compost without ABX	0	Lettuce	1	1000	1000	3	FALSE
Compost without ABX	0	Radish	1	1000	1000	3	FALSE
Compost without ABX	0	Lettuce	4	1000	4000	3.602059991	FALSE
Compost with ABX	0	Radish	1	1000	1000	3	FALSE
Compost with ABX	0	Lettuce	8	1000	8000	3.903089987	FALSE
Compost with ABX	0	Radish	0	1000	0	0	TRUE
Compost with ABX	0	Lettuce	1	1000	1000	3	FALSE
Compost with ABX	0	Radish	2	1000	2000	3.301029996	FALSE
Compost with ABX	0	Lettuce	33	1000	33000	4.51851394	FALSE
Manure with ABX	0	Radish	0	1000	0	0	TRUE
Manure with ABX	0	Lettuce	18	1000	18000	4.255272505	FALSE

Manure with ABX	0	Radish	1	1000	1000	3	FALSE
Manure with ABX	0	Lettuce	0	1000	0	0	TRUE
Manure with ABX	0	Radish	86	1000	86000	4.934498451	FALSE
Manure with ABX	0	Lettuce	4	1000	4000	3.602059991	FALSE
No Amendment Control	7	None	3	1000	3000	3.477121255	FALSE
No Amendment Control	7	None	0	1000	0	0	TRUE
No Amendment Control	7	None	0	1000	0	0	TRUE
Fertilizer Control	7	Radish	1	1000	1000	3	FALSE
Fertilizer Control	7	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	7	Radish	4	1000	4000	3.602059991	FALSE
Fertilizer Control	7	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	7	Radish	0	1000	0	0	TRUE
Fertilizer Control	7	Lettuce	0	1000	0	0	TRUE
Compost without ABX	7	Radish	0	1000	0	0	TRUE
Compost without ABX	7	Lettuce	6	1000	6000	3.77815125	FALSE
Compost without ABX	7	Radish	1	1000	1000	3	FALSE
Compost without ABX	7	Lettuce	0	1000	0	0	FALSE
Compost without ABX	7	Radish	1	1000	1000	3	FALSE
Compost without ABX	7	Lettuce	1	1000	1000	3	FALSE
Compost with ABX	7	Radish	1	1000	1000	3	FALSE
Compost with ABX	7	Lettuce	2	1000	2000	3.301029996	FALSE
Compost with ABX	7	Radish	0	1000	0	0	TRUE
Compost with ABX	7	Lettuce	0	1000	0	0	TRUE
Compost with ABX	7	Radish	0	1000	0	0	TRUE
Compost with ABX	7	Lettuce	1	1000	1000	3	FALSE
Manure with ABX	7	Radish	1	1000	1000	3	FALSE
Manure with ABX	7	Lettuce	13	1000	13000	4.113943352	FALSE

Manure with ABX	7	Radish	4	1000	4000	3.602059991	FALSE
Manure with ABX	7	Lettuce	2	1000	2000	3.301029996	FALSE
Manure with ABX	7	Radish	9	1000	9000	3.954242509	FALSE
Manure with ABX	7	Lettuce	3	1000	3000	3.477121255	FALSE
No Amendment Control	7	None	0	1000	0	0	TRUE
No Amendment Control	7	None	1	1000	1000	3	FALSE
No Amendment Control	7	None	0	1000	0	0	TRUE
Fertilizer Control	7	Radish	1	1000	1000	3	FALSE
Fertilizer Control	7	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	7	Radish	0	1000	0	0	TRUE
Fertilizer Control	7	Lettuce	2	1000	2000	3.301029996	FALSE
Fertilizer Control	7	Radish	0	1000	0	0	TRUE
Fertilizer Control	7	Lettuce	0	1000	0	0	TRUE
Compost without ABX	7	Radish	0	1000	0	0	TRUE
Compost without ABX	7	Lettuce	3	1000	3000	3.477121255	FALSE
Compost without ABX	7	Radish	0	1000	0	0	TRUE
Compost without ABX	7	Lettuce	0	1000	0	0	TRUE
Compost without ABX	7	Radish	3	1000	3000	3.477121255	FALSE
Compost without ABX	7	Lettuce	1	1000	1000	3	FALSE
Compost with ABX	7	Radish	0	1000	0	0	TRUE
Compost with ABX	7	Lettuce	0	1000	0	0	TRUE
Compost with ABX	7	Radish	0	1000	0	0	TRUE
Compost with ABX	7	Lettuce	0	1000	0	0	TRUE
Compost with ABX	7	Radish	0	1000	0	0	TRUE
Compost with ABX	7	Lettuce	0	1000	0	0	TRUE
Manure with ABX	7	Radish	6	1000	6000	3.77815125	FALSE
Manure with ABX	7	Lettuce	11	1000	11000	4.041392685	FALSE

Manure with ABX	7	Radish	12	1000	12000	4.079181246	FALSE
Manure with ABX	7	Lettuce	3	1000	3000	3.477121255	FALSE
Manure with ABX	7	Radish	8	1000	8000	3.903089987	FALSE
Manure with ABX	7	Lettuce	2	1000	2000	3.301029996	FALSE
No Amendment Control	7	None	0	1000	0	0	TRUE
No Amendment Control	7	None	2	1000	2000	3.301029996	FALSE
No Amendment Control	7	None	0	1000	0	0	TRUE
Fertilizer Control	7	Radish	1	1000	1000	3	FALSE
Fertilizer Control	7	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	7	Radish	3	1000	3000	3.477121255	FALSE
Fertilizer Control	7	Lettuce	2	1000	2000	3.301029996	FALSE
Fertilizer Control	7	Radish	0	1000	0	0	TRUE
Fertilizer Control	7	Lettuce	0	1000	0	0	TRUE
Compost without ABX	7	Radish	0	1000	0	0	TRUE
Compost without ABX	7	Lettuce	8	1000	8000	3.903089987	FALSE
Compost without ABX	7	Radish	0	1000	0	0	TRUE
Compost without ABX	7	Lettuce	2	1000	2000	3.301029996	FALSE
Compost without ABX	7	Radish	5	1000	5000	3.698970004	FALSE
Compost without ABX	7	Lettuce	1	1000	1000	3	FALSE
Compost with ABX	7	Radish	0	1000	0	0	TRUE
Compost with ABX	7	Lettuce	1	1000	1000	3	FALSE
Compost with ABX	7	Radish	3	1000	3000	3.477121255	FALSE
Compost with ABX	7	Lettuce	1	1000	1000	3	FALSE
Compost with ABX	7	Radish	3	1000	3000	3.477121255	FALSE
Compost with ABX	7	Lettuce	0	1000	0	0	TRUE
Manure with ABX	7	Radish	1	1000	1000	3	FALSE
Manure with ABX	7	Lettuce	18	1000	18000	4.255272505	FALSE

Manure with ABX	7	Radish	13	1000	13000	4.113943352	FALSE
Manure with ABX	7	Lettuce	6	1000	6000	3.77815125	FALSE
Manure with ABX	7	Radish	20	1000	20000	4.301029996	FALSE
Manure with ABX	7	Lettuce	10	1000	10000	4	FALSE
No Amendment Control	28	None	0	1000	0	0	TRUE
No Amendment Control	28	None	2	1000	2000	3.301029996	FALSE
No Amendment Control	28	None	1	1000	1000	3	FALSE
Fertilizer Control	28	Radish	0	1000	0	0	TRUE
Fertilizer Control	28	Lettuce	25	1000	25000	4.397940009	FALSE
Fertilizer Control	28	Radish	0	1000	0	0	TRUE
Fertilizer Control	28	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	28	Radish	4	1000	4000	3.602059991	FALSE
Fertilizer Control	28	Lettuce	0	1000	0	0	TRUE
Compost without ABX	28	Radish	0	1000	0	0	TRUE
Compost without ABX	28	Lettuce	4	1000	4000	3.602059991	FALSE
Compost without ABX	28	Radish	3	1000	3000	3.477121255	FALSE
Compost without ABX	28	Lettuce	1	1000	1000	3	FALSE
Compost without ABX	28	Radish	1	1000	1000	3	FALSE
Compost without ABX	28	Lettuce	17	1000	17000	4.230448921	FALSE
Compost with ABX	28	Radish	7	1000	7000	3.84509804	FALSE
Compost with ABX	28	Lettuce	6	1000	6000	3.77815125	FALSE
Compost with ABX	28	Radish	7	1000	7000	3.84509804	FALSE
Compost with ABX	28	Lettuce	20	1000	20000	4.301029996	FALSE
Compost with ABX	28	Radish	7	1000	7000	3.84509804	FALSE
Compost with ABX	28	Lettuce	1	1000	1000	3	FALSE
Manure with ABX	28	Radish	40	1000	40000	4.602059991	FALSE
Manure with ABX	28	Lettuce	2	1000	2000	3.301029996	FALSE

Manure with ABX	28	Radish	0	1000	0	0	TRUE
Manure with ABX	28	Lettuce	0	1000	0	0	TRUE
Manure with ABX	28	Radish	1	1000	1000	3	FALSE
Manure with ABX	28	Lettuce	9	1000	9000	3.954242509	FALSE
No Amendment Control	28	None	0	1000	0	0	TRUE
No Amendment Control	28	None	2	1000	2000	3.301029996	FALSE
No Amendment Control	28	None	0	1000	0	0	TRUE
Fertilizer Control	28	Radish	1	1000	1000	3	FALSE
Fertilizer Control	28	Lettuce	4	1000	4000	3.602059991	FALSE
Fertilizer Control	28	Radish	0	1000	0	0	TRUE
Fertilizer Control	28	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	28	Radish	2	1000	2000	3.301029996	FALSE
Fertilizer Control	28	Lettuce	1	1000	1000	3	FALSE
Compost without ABX	28	Radish	1	1000	1000	3	FALSE
Compost without ABX	28	Lettuce	6	1000	6000	3.77815125	FALSE
Compost without ABX	28	Radish	0	1000	0	0	TRUE
Compost without ABX	28	Lettuce	0	1000	0	0	TRUE
Compost without ABX	28	Radish	1	1000	1000	3	FALSE
Compost without ABX	28	Lettuce	4	1000	4000	3.602059991	FALSE
Compost with ABX	28	Radish	12	1000	12000	4.079181246	FALSE
Compost with ABX	28	Lettuce	3	1000	3000	3.477121255	FALSE
Compost with ABX	28	Radish	0	1000	0	0	TRUE
Compost with ABX	28	Lettuce	15	1000	15000	4.176091259	FALSE
Compost with ABX	28	Radish	10	1000	10000	4	FALSE
Compost with ABX	28	Lettuce	1	1000	1000	3	FALSE
Manure with ABX	28	Radish	13	1000	13000	4.113943352	FALSE
Manure with ABX	28	Lettuce	1	1000	1000	3	FALSE

Manure with ABX	28	Radish	1	1000	1000	3	FALSE
Manure with ABX	28	Lettuce	0	1000	0	0	TRUE
Manure with ABX	28	Radish	1	1000	1000	3	FALSE
Manure with ABX	28	Lettuce	8	1000	8000	3.903089987	FALSE
No Amendment Control	28	None	0	1000	0	0	TRUE
No Amendment Control	28	None	1	1000	1000	3	FALSE
No Amendment Control	28	None	0	1000	0	0	TRUE
Fertilizer Control	28	Radish	0	1000	0	0	TRUE
Fertilizer Control	28	Lettuce	2	1000	2000	3.301029996	FALSE
Fertilizer Control	28	Radish	5	1000	5000	3.698970004	FALSE
Fertilizer Control	28	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	28	Radish	2	1000	2000	3.301029996	FALSE
Fertilizer Control	28	Lettuce	0	1000	0	0	TRUE
Compost without ABX	28	Radish	0	1000	0	0	TRUE
Compost without ABX	28	Lettuce	8	1000	8000	3.903089987	FALSE
Compost without ABX	28	Radish	0	1000	0	0	TRUE
Compost without ABX	28	Lettuce	4	1000	4000	3.602059991	FALSE
Compost without ABX	28	Radish	0	1000	0	0	TRUE
Compost without ABX	28	Lettuce	7	1000	7000	3.84509804	FALSE
Compost with ABX	28	Radish	13	1000	13000	4.113943352	FALSE
Compost with ABX	28	Lettuce	2	1000	2000	3.301029996	FALSE
Compost with ABX	28	Radish	0	1000	0	0	TRUE
Compost with ABX	28	Lettuce	9	1000	9000	3.954242509	FALSE
Compost with ABX	28	Radish	10	1000	10000	4	FALSE
Compost with ABX	28	Lettuce	0	1000	0	0	TRUE
Manure with ABX	28	Radish	14	1000	14000	4.146128036	FALSE
Manure with ABX	28	Lettuce	1	1000	1000	3	FALSE

Manure with ABX	28	Radish	0	1000	0	0	TRUE
Manure with ABX	28	Lettuce	2	1000	2000	3.301029996	FALSE
Manure with ABX	28	Radish	0	1000	0	0	TRUE
Manure with ABX	28	Lettuce	4	1000	4000	3.602059991	FALSE
No Amendment Control	42	None	0	1000	0	0	TRUE
No Amendment Control	42	None	16	1000	16000	4.204119983	FALSE
No Amendment Control	42	None	0	1000	0	0	TRUE
Fertilizer Control	42	Radish	19	1000	19000	4.278753601	FALSE
Fertilizer Control	42	Lettuce	292	10000	2920000	6.465382851	FALSE
Fertilizer Control	42	Radish	0	1000	0	0	TRUE
Fertilizer Control	42	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	42	Radish	0	1000	0	0	TRUE
Fertilizer Control	42	Lettuce	13	1000	13000	4.113943352	FALSE
Compost without ABX	42	Radish	7	1000	7000	3.84509804	FALSE
Compost without ABX	42	Lettuce	0	1000	0	0	TRUE
Compost without ABX	42	Radish	0	1000	0	0	TRUE
Compost without ABX	42	Lettuce	0	1000	0	0	TRUE
Compost without ABX	42	Radish	3	1000	3000	3.477121255	FALSE
Compost without ABX	42	Lettuce	3	1000	3000	3.477121255	FALSE
Compost with ABX	42	Radish	90	1000	90000	4.954242509	FALSE
Compost with ABX	42	Lettuce	2	1000	2000	3.301029996	FALSE
Compost with ABX	42	Radish	0	1000	0	0	TRUE
Compost with ABX	42	Lettuce	0	1000	0	0	TRUE
Compost with ABX	42	Radish	101	1000	101000	5.004321374	FALSE
Compost with ABX	42	Lettuce	0	1000	0	0	TRUE
Manure with ABX	42	Radish	4	1000	4000	3.602059991	FALSE
Manure with ABX	42	Lettuce	48	1000	48000	4.681241237	FALSE

Manure with ABX	42	Radish	42	1000	42000	4.62324929	FALSE
Manure with ABX	42	Lettuce	0	1000	0	0	TRUE
Manure with ABX	42	Radish	1	1000	1000	3	FALSE
Manure with ABX	42	Lettuce	1	1000	1000	3	FALSE
No Amendment Control	42	None	2	1000	2000	3.301029996	FALSE
No Amendment Control	42	None	0	1000	0	0	TRUE
No Amendment Control	42	None	0	1000	0	0	TRUE
Fertilizer Control	42	Radish	40	1000	40000	4.602059991	FALSE
Fertilizer Control	42	Lettuce	172	10000	1720000	6.235528447	FALSE
Fertilizer Control	42	Radish	0	1000	0	0	TRUE
Fertilizer Control	42	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	42	Radish	2	1000	2000	3.301029996	FALSE
Fertilizer Control	42	Lettuce	46	1000	46000	4.662757832	FALSE
Compost without ABX	42	Radish	5	1000	5000	3.698970004	FALSE
Compost without ABX	42	Lettuce	0	1000	0	0	TRUE
Compost without ABX	42	Radish	2	1000	2000	3.301029996	FALSE
Compost without ABX	42	Lettuce	0	1000	0	0	TRUE
Compost without ABX	42	Radish	4	1000	4000	3.602059991	FALSE
Compost without ABX	42	Lettuce	0	1000	0	0	TRUE
Compost with ABX	42	Radish	43	1000	43000	4.633468456	FALSE
Compost with ABX	42	Lettuce	1	1000	1000	3	FALSE
Compost with ABX	42	Radish	0	1000	0	0	TRUE
Compost with ABX	42	Lettuce	0	1000	0	0	TRUE
Compost with ABX	42	Radish	121	1000	121000	5.08278537	FALSE
Compost with ABX	42	Lettuce	0	1000	0	0	TRUE
Manure with ABX	42	Radish	0	1000	0	0	TRUE
Manure with ABX	42	Lettuce	14	1000	14000	4.146128036	FALSE

Manure with ABX	42	Radish	29	1000	29000	4.462397998	FALSE
Manure with ABX	42	Lettuce	0	1000	0	0	TRUE
Manure with ABX	42	Radish	12	1000	12000	4.079181246	FALSE
Manure with ABX	42	Lettuce	0	1000	0	0	TRUE
No Amendment Control	42	None	7	1000	7000	3.84509804	FALSE
No Amendment Control	42	None	0	1000	0	0	TRUE
No Amendment Control	42	None	0	1000	0	0	TRUE
Fertilizer Control	42	Radish	12	1000	12000	4.079181246	FALSE
Fertilizer Control	42	Lettuce	304	10000	3040000	6.482873584	FALSE
Fertilizer Control	42	Radish	0	1000	0	0	TRUE
Fertilizer Control	42	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	42	Radish	1	1000	1000	3	FALSE
Fertilizer Control	42	Lettuce	0	1000	0	0	TRUE
Compost without ABX	42	Radish	4	1000	4000	3.602059991	FALSE
Compost without ABX	42	Lettuce	0	1000	0	0	TRUE
Compost without ABX	42	Radish	0	1000	0	0	TRUE
Compost without ABX	42	Lettuce	0	1000	0	0	TRUE
Compost without ABX	42	Radish	3	1000	3000	3.477121255	FALSE
Compost without ABX	42	Lettuce	1	1000	1000	3	FALSE
Compost with ABX	42	Radish	69	1000	69000	4.838849091	FALSE
Compost with ABX	42	Lettuce	1	1000	1000	3	FALSE
Compost with ABX	42	Radish	0	1000	0	0	TRUE
Compost with ABX	42	Lettuce	0	1000	0	0	TRUE
Compost with ABX	42	Radish	0	1000	0	0	TRUE
Compost with ABX	42	Lettuce	0	1000	0	0	TRUE
Manure with ABX	42	Radish	0	1000	0	0	TRUE
Manure with ABX	42	Lettuce	2	1000	2000	3.301029996	FALSE

Manure with ABX	42	Radish	49	1000	49000	4.69019608	FALSE
Manure with ABX	42	Lettuce	0	1000	0	0	TRUE
Manure with ABX	42	Radish	7	1000	7000	3.84509804	FALSE
Manure with ABX	42	Lettuce	1	1000	1000	3	FALSE
No Amendment Control	56	None	0	1000	0	0	TRUE
No Amendment Control	56	None	0	1000	0	0	TRUE
No Amendment Control	56	None	0	1000	0	0	TRUE
Fertilizer Control	56	Radish	14	1000	14000	4.146128036	FALSE
Fertilizer Control	56	Lettuce	47	1000	47000	4.672097858	FALSE
Fertilizer Control	56	Radish	0	1000	0	0	TRUE
Fertilizer Control	56	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	56	Radish	0	1000	0	0	TRUE
Fertilizer Control	56	Lettuce	0	1000	0	0	TRUE
Compost without ABX	56	Radish	0	1000	0	0	TRUE
Compost without ABX	56	Lettuce	12	1000	12000	4.079181246	FALSE
Compost without ABX	56	Radish	9	1000	9000	3.954242509	FALSE
Compost without ABX	56	Lettuce	18	1000	18000	4.255272505	FALSE
Compost without ABX	56	Radish	240	1000	240000	5.380211242	FALSE
Compost without ABX	56	Lettuce	17	1000	17000	4.230448921	FALSE
Compost with ABX	56	Radish	5	1000	5000	3.698970004	FALSE
Compost with ABX	56	Lettuce	0	1000	0	0	TRUE
Compost with ABX	56	Radish		1000	0	0	TRUE
Compost with ABX	56	Lettuce	1	1000	1000	3	FALSE
Compost with ABX	56	Radish	0	1000	0	0	TRUE
Compost with ABX	56	Lettuce	46	1000	46000	4.662757832	FALSE
Manure with ABX	56	Radish	0	1000	0	0	TRUE
Manure with ABX	56	Lettuce	0	1000	0	0	TRUE

Manure with ABX	56	Radish	0	1000	0	0	TRUE
Manure with ABX	56	Lettuce	0	1000	0	0	TRUE
Manure with ABX	56	Radish	0	1000	0	0	TRUE
Manure with ABX	56	Lettuce	0	1000	0	0	TRUE
No Amendment Control	56	None	1	1000	1000	3	FALSE
No Amendment Control	56	None	0	1000	0	0	TRUE
No Amendment Control	56	None	0	1000	0	0	TRUE
Fertilizer Control	56	Radish	53	1000	53000	4.72427587	FALSE
Fertilizer Control	56	Lettuce	108	1000	108000	5.033423755	FALSE
Fertilizer Control	56	Radish	0	1000	0	0	TRUE
Fertilizer Control	56	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	56	Radish	0	1000	0	0	TRUE
Fertilizer Control	56	Lettuce	70	1000	70000	4.84509804	FALSE
Compost without ABX	56	Radish	1	1000	1000	3	FALSE
Compost without ABX	56	Lettuce	0	1000	0	0	TRUE
Compost without ABX	56	Radish	11	1000	11000	4.041392685	FALSE
Compost without ABX	56	Lettuce	1	1000	1000	3	FALSE
Compost without ABX	56	Radish	45	1000	45000	4.653212514	FALSE
Compost without ABX	56	Lettuce	1	1000	1000	3	FALSE
Compost with ABX	56	Radish	31	1000	31000	4.491361694	FALSE
Compost with ABX	56	Lettuce	0	1000	0	0	TRUE
Compost with ABX	56	Radish	0	1000	0	0	TRUE
Compost with ABX	56	Lettuce	3	1000	3000	3.477121255	FALSE
Compost with ABX	56	Radish	0	1000	0	0	TRUE
Compost with ABX	56	Lettuce	80	1000	80000	4.903089987	FALSE
Manure with ABX	56	Radish	1	1000	1000	3	FALSE
Manure with ABX	56	Lettuce	1	1000	1000	3	FALSE

Manure with ABX	56	Radish	1	1000	1000	3	FALSE
Manure with ABX	56	Lettuce	0	1000	0	0	TRUE
Manure with ABX	56	Radish	4	1000	4000	3.602059991	FALSE
Manure with ABX	56	Lettuce	0	1000	0	0	TRUE
No Amendment Control	56	None	1	1000	1000	3	FALSE
No Amendment Control	56	None	0	1000	0	0	TRUE
No Amendment Control	56	None	1	1000	1000	3	FALSE
Fertilizer Control	56	Radish	44	1000	44000	4.643452676	FALSE
Fertilizer Control	56	Lettuce	11	1000	11000	4.041392685	FALSE
Fertilizer Control	56	Radish	0	1000	0	0	TRUE
Fertilizer Control	56	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	56	Radish	0	1000	0	0	TRUE
Fertilizer Control	56	Lettuce	0	1000	0	0	TRUE
Compost without ABX	56	Radish	1	1000	1000	3	FALSE
Compost without ABX	56	Lettuce	2	1000	2000	3.301029996	FALSE
Compost without ABX	56	Radish	44	1000	44000	4.643452676	FALSE
Compost without ABX	56	Lettuce	2	1000	2000	3.301029996	FALSE
Compost without ABX	56	Radish	2	1000	2000	3.301029996	FALSE
Compost without ABX	56	Lettuce	1	1000	1000	3	FALSE
Compost with ABX	56	Radish	12	1000	12000	4.079181246	FALSE
Compost with ABX	56	Lettuce	0	1000	0	0	TRUE
Compost with ABX	56	Radish	0	1000	0	0	TRUE
Compost with ABX	56	Lettuce	3	1000	3000	3.477121255	FALSE
Compost with ABX	56	Radish	0	1000	0	0	TRUE
Compost with ABX	56	Lettuce	420	1000	420000	5.62324929	FALSE
Manure with ABX	56	Radish	1	1000	1000	3	FALSE
Manure with ABX	56	Lettuce	4	1000	4000	3.602059991	FALSE

Manure with ABX	56	Radish	0	1000	0	0	TRUE
Manure with ABX	56	Lettuce	23	1000	23000	4.361727836	FALSE
Manure with ABX	56	Radish	0	1000	0	0	TRUE
Manure with ABX	56	Lettuce	2	1000	2000	3.301029996	FALSE
No Amendment Control	90	None	11	1000	11000	4.041392685	FALSE
No Amendment Control	90	None	8	1000	8000	3.903089987	FALSE
No Amendment Control	90	None	31	1000	31000	4.491361694	FALSE
Fertilizer Control	90	Radish	37	1000	37000	4.568201724	FALSE
Fertilizer Control	90	Lettuce	6	1000	6000	3.77815125	FALSE
Fertilizer Control	90	Radish	74	1000	74000	4.86923172	FALSE
Fertilizer Control	90	Lettuce	12	1000	12000	4.079181246	FALSE
Fertilizer Control	90	Radish	68	1000	68000	4.832508913	FALSE
Fertilizer Control	90	Lettuce	25	1000	25000	4.397940009	FALSE
Compost without ABX	90	Radish	0	1000	0	0	TRUE
Compost without ABX	90	Lettuce	55	1000	55000	4.740362689	FALSE
Compost without ABX	90	Radish	50	1000	50000	4.698970004	FALSE
Compost without ABX	90	Lettuce	3	1000	3000	3.477121255	FALSE
Compost without ABX	90	Radish	120	1000	120000	5.079181246	FALSE
Compost without ABX	90	Lettuce	8	1000	8000	3.903089987	FALSE
Compost with ABX	90	Radish	3	1000	3000	3.477121255	FALSE
Compost with ABX	90	Lettuce	21	1000	21000	4.322219295	FALSE
Compost with ABX	90	Radish	11	1000	11000	4.041392685	FALSE
Compost with ABX	90	Lettuce	18	1000	18000	4.255272505	FALSE
Compost with ABX	90	Radish	2	1000	2000	3.301029996	FALSE
Compost with ABX	90	Lettuce	42	1000	42000	4.62324929	FALSE
Manure with ABX	90	Radish	23	1000	23000	4.361727836	FALSE
Manure with ABX	90	Lettuce	20	1000	20000	4.301029996	FALSE

Manure with ABX	90	Radish	0	1000	0	0	TRUE
Manure with ABX	90	Lettuce	164	1000	164000	5.214843848	FALSE
Manure with ABX	90	Radish	23	1000	23000	4.361727836	FALSE
Manure with ABX	90	Lettuce	83	1000	83000	4.919078092	FALSE
No Amendment Control	90	None	6	1000	6000	3.77815125	FALSE
No Amendment Control	90	None	9	1000	9000	3.954242509	FALSE
No Amendment Control	90	None	28	1000	28000	4.447158031	FALSE
Fertilizer Control	90	Radish	22	1000	22000	4.342422681	FALSE
Fertilizer Control	90	Lettuce	2	1000	2000	3.301029996	FALSE
Fertilizer Control	90	Radish	59	1000	59000	4.770852012	FALSE
Fertilizer Control	90	Lettuce	4	1000	4000	3.602059991	FALSE
Fertilizer Control	90	Radish	64	1000	64000	4.806179974	FALSE
Fertilizer Control	90	Lettuce	63	1000	63000	4.799340549	FALSE
Compost without ABX	90	Radish	2	1000	2000	3.301029996	FALSE
Compost without ABX	90	Lettuce	69	1000	69000	4.838849091	FALSE
Compost without ABX	90	Radish	50	1000	50000	4.698970004	FALSE
Compost without ABX	90	Lettuce	38	1000	38000	4.579783597	FALSE
Compost without ABX	90	Radish	96	1000	96000	4.982271233	FALSE
Compost without ABX	90	Lettuce	7	1000	7000	3.84509804	FALSE
Compost with ABX	90	Radish	7	1000	7000	3.84509804	FALSE
Compost with ABX	90	Lettuce	18	1000	18000	4.255272505	FALSE
Compost with ABX	90	Radish	6	1000	6000	3.77815125	FALSE
Compost with ABX	90	Lettuce	16	1000	16000	4.204119983	FALSE
Compost with ABX	90	Radish	10	1000	10000	4	FALSE
Compost with ABX	90	Lettuce	52	1000	52000	4.716003344	FALSE
Manure with ABX	90	Radish	18	1000	18000	4.255272505	FALSE
Manure with ABX	90	Lettuce	55	1000	55000	4.740362689	FALSE

Manure with ABX	90	Radish	0	1000	0	0	TRUE
Manure with ABX	90	Lettuce	214	1000	214000	5.330413773	FALSE
Manure with ABX	90	Radish	29	1000	29000	4.462397998	FALSE
Manure with ABX	90	Lettuce	68	1000	68000	4.832508913	FALSE
No Amendment Control	90	None	13	1000	13000	4.113943352	FALSE
No Amendment Control	90	None	4	1000	4000	3.602059991	FALSE
No Amendment Control	90	None	21	1000	21000	4.322219295	FALSE
Fertilizer Control	90	Radish	28	1000	28000	4.447158031	FALSE
Fertilizer Control	90	Lettuce	3	1000	3000	3.477121255	FALSE
Fertilizer Control	90	Radish	51	1000	51000	4.707570176	FALSE
Fertilizer Control	90	Lettuce	5	1000	5000	3.698970004	FALSE
Fertilizer Control	90	Radish	78	1000	78000	4.892094603	FALSE
Fertilizer Control	90	Lettuce	5	1000	5000	3.698970004	FALSE
Compost without ABX	90	Radish	0	1000	0	0	TRUE
Compost without ABX	90	Lettuce	84	1000	84000	4.924279286	FALSE
Compost without ABX	90	Radish	50	1000	50000	4.698970004	FALSE
Compost without ABX	90	Lettuce	4	1000	4000	3.602059991	FALSE
Compost without ABX	90	Radish	101	1000	101000	5.004321374	FALSE
Compost without ABX	90	Lettuce	10	1000	10000	4	FALSE
Compost with ABX	90	Radish	20	1000	20000	4.301029996	FALSE
Compost with ABX	90	Lettuce	18	1000	18000	4.255272505	FALSE
Compost with ABX	90	Radish	16	1000	16000	4.204119983	FALSE
Compost with ABX	90	Lettuce	12	1000	12000	4.079181246	FALSE
Compost with ABX	90	Radish	1	1000	1000	3	FALSE
Compost with ABX	90	Lettuce	96	1000	96000	4.982271233	FALSE
Manure with ABX	90	Radish	62	1000	62000	4.792391689	FALSE
Manure with ABX	90	Lettuce	41	1000	41000	4.612783857	FALSE

Manure with ABX	90	Radish	3	1000	3000	3.477121255	FALSE
Manure with ABX	90	Lettuce	246	1000	246000	5.390935107	FALSE
Manure with ABX	90	Radish	63	1000	63000	4.799340549	FALSE
Manure with ABX	90	Lettuce	78	1000	78000	4.892094603	FALSE
No Amendment Control	120	None	0	1000	0	0	TRUE
No Amendment Control	120	None	15	1000	15000	4.176091259	FALSE
No Amendment Control	120	None	3	1000	3000	3.477121255	FALSE
Fertilizer Control	120	Radish	103	1000	103000	5.012837225	FALSE
Fertilizer Control	120	Lettuce	5	1000	5000	3.698970004	FALSE
Fertilizer Control	120	Radish	2	1000	2000	3.301029996	FALSE
Fertilizer Control	120	Lettuce	91	1000	91000	4.959041392	FALSE
Fertilizer Control	120	Radish	0	1000	0	0	TRUE
Fertilizer Control	120	Lettuce	0	1000	0	0	TRUE
Compost without ABX	120	Radish	2	1000	2000	3.301029996	FALSE
Compost without ABX	120	Lettuce	0	1000	0	0	TRUE
Compost without ABX	120	Radish	53	1000	53000	4.72427587	FALSE
Compost without ABX	120	Lettuce	684	10000	6840000	6.835056102	FALSE
Compost without ABX	120	Radish	13	1000	13000	4.113943352	FALSE
Compost without ABX	120	Lettuce	100	1000	100000	5	FALSE
Compost with ABX	120	Radish	17	1000	17000	4.230448921	FALSE
Compost with ABX	120	Lettuce	4	1000	4000	3.602059991	FALSE
Compost with ABX	120	Radish	8	1000	8000	3.903089987	FALSE
Compost with ABX	120	Lettuce	17	1000	17000	4.230448921	FALSE
Compost with ABX	120	Radish	1	1000	1000	3	FALSE
Compost with ABX	120	Lettuce	92	1000	92000	4.963787827	FALSE
Manure with ABX	120	Radish	28	10000	280000	5.447158031	FALSE
Manure with ABX	120	Lettuce	91	1000	91000	4.959041392	FALSE

Manure with ABX	120	Radish	0	1000	0	0	TRUE
Manure with ABX	120	Lettuce	47	1000	47000	4.672097858	FALSE
Manure with ABX	120	Radish	2	1000	2000	3.301029996	FALSE
Manure with ABX	120	Lettuce	26	1000	26000	4.414973348	FALSE
No Amendment Control	120	None	3	1000	3000	3.477121255	FALSE
No Amendment Control	120	None	3	1000	3000	3.477121255	FALSE
No Amendment Control	120	None	9	1000	9000	3.954242509	FALSE
Fertilizer Control	120	Radish	82	1000	82000	4.913813852	FALSE
Fertilizer Control	120	Lettuce	3	1000	3000	3.477121255	FALSE
Fertilizer Control	120	Radish	5	1000	5000	3.698970004	FALSE
Fertilizer Control	120	Lettuce	2	1000	2000	3.301029996	FALSE
Fertilizer Control	120	Radish	0	1000	0	0	TRUE
Fertilizer Control	120	Lettuce	2	1000	2000	3.301029996	FALSE
Compost without ABX	120	Radish	3	1000	3000	3.477121255	FALSE
Compost without ABX	120	Lettuce	4	1000	4000	3.602059991	FALSE
Compost without ABX	120	Radish	48	1000	48000	4.681241237	FALSE
Compost without ABX	120	Lettuce	376	1000	376000	5.575187845	FALSE
Compost without ABX	120	Radish	23	1000	23000	4.361727836	FALSE
Compost without ABX	120	Lettuce	29	1000	29000	4.462397998	FALSE
Compost with ABX	120	Radish	3	1000	3000	3.477121255	FALSE
Compost with ABX	120	Lettuce	5	1000	5000	3.698970004	FALSE
Compost with ABX	120	Radish	0	1000	0	0	TRUE
Compost with ABX	120	Lettuce	28	1000	28000	4.447158031	FALSE
Compost with ABX	120	Radish	18	1000	18000	4.255272505	FALSE
Compost with ABX	120	Lettuce	121	1000	121000	5.08278537	FALSE
Manure with ABX	120	Radish	42	10000	420000	5.62324929	FALSE
Manure with ABX	120	Lettuce	118	1000	118000	5.071882007	FALSE

Manure with ABX	120	Radish	0	1000	0	0	TRUE
Manure with ABX	120	Lettuce	49	1000	49000	4.69019608	FALSE
Manure with ABX	120	Radish	0	1000	0	0	TRUE
Manure with ABX	120	Lettuce	47	1000	47000	4.672097858	FALSE
No Amendment Control	120	None	16	1000	16000	4.204119983	FALSE
No Amendment Control	120	None	0	1000	0	0	TRUE
No Amendment Control	120	None	21	1000	21000	4.322219295	FALSE
Fertilizer Control	120	Radish	91	1000	91000	4.959041392	FALSE
Fertilizer Control	120	Lettuce	16	1000	16000	4.204119983	FALSE
Fertilizer Control	120	Radish	8	1000	8000	3.903089987	FALSE
Fertilizer Control	120	Lettuce	23	1000	23000	4.361727836	FALSE
Fertilizer Control	120	Radish	0	1000	0	0	TRUE
Fertilizer Control	120	Lettuce	2	1000	2000	3.301029996	FALSE
Compost without ABX	120	Radish	3	1000	3000	3.477121255	FALSE
Compost without ABX	120	Lettuce	0	1000	0	0	TRUE
Compost without ABX	120	Radish	41	1000	41000	4.612783857	FALSE
Compost without ABX	120	Lettuce	304	1000	304000	5.482873584	FALSE
Compost without ABX	120	Radish	19	1000	19000	4.278753601	FALSE
Compost without ABX	120	Lettuce	2	1000	2000	3.301029996	FALSE
Compost with ABX	120	Radish	22	1000	22000	4.342422681	FALSE
Compost with ABX	120	Lettuce	24	1000	24000	4.380211242	FALSE
Compost with ABX	120	Radish	7	1000	7000	3.84509804	FALSE
Compost with ABX	120	Lettuce	37	1000	37000	4.568201724	FALSE
Compost with ABX	120	Radish	0	1000	0	0	TRUE
Compost with ABX	120	Lettuce	94	1000	94000	4.973127854	FALSE
Manure with ABX	120	Radish	36	10000	360000	5.556302501	FALSE
Manure with ABX	120	Lettuce	268	1000	268000	5.428134794	FALSE

Manure with ABX	120	Radish	0	1000	0	0	TRUE
Manure with ABX	120	Lettuce	56	1000	56000	4.748188027	FALSE
Manure with ABX	120	Radish	1	1000	1000	3	FALSE
Manure with ABX	120	Lettuce	42	1000	42000	4.62324929	FALSE

APPENDIX J. Raw Data: Colony Counts from Ceftazidime MacConkey Agar Plates for entire study.

Table J.1. Table I.1. Colony counts, dilution, and CFU's for Day -1, 0, 7, 28, 42, 56, 90, and 120 Ceftazidime Plates.

Treatment	Time	Vegetable	Colonies Counted	Dilution Factor	CFU E. coli/ g soil	log10 CFU E. coli/ g soil	Censored CFU
No Amendment Control	-1	None	0	1000	0	0	TRUE
No Amendment Control	-1	None	0	1000	0	0	TRUE
No Amendment Control	-1	None	0	1000	0	0	TRUE
Fertilizer Control	-1	Radish	8	1000	8000	3.903089987	FALSE
Fertilizer Control	-1	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	-1	Radish	0	1000	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	-1	Radish	2	1000	2000	3.301029996	FALSE
Compost without ABX	-1	Lettuce	0	1000	0	0	TRUE
Compost with ABX	-1	Radish	0	1000	0	0	TRUE
Compost with ABX	-1	Lettuce	0	1000	0	0	TRUE
No Amendment Control	-1	None	0	1000	0	0	TRUE
No Amendment Control	-1	None	0	1000	0	0	TRUE
No Amendment Control	-1	None	0	1000	0	0	TRUE
Fertilizer Control	-1	Radish	1	1000	1000	3	FALSE
Fertilizer Control	-1	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	-1	Radish	0	1000	0	0	TRUE
Fertilizer Control	-1	Lettuce	2	1000	2000	3.301029996	FALSE
Compost without ABX	-1	Lettuce	0	1000	0	0	TRUE
Compost with ABX	-1	Radish	0	1000	0	0	TRUE
Compost with ABX	-1	Radish	0	1000	0	0	TRUE
No Amendment Control	-1	None	2	1000	2000	3.301029996	FALSE

No Amendment Control	-1	None	0	1000	0	0	TRUE
No Amendment Control	-1	None	0	1000	0	0	TRUE
Fertilizer Control	-1	Radish	0	1000	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	-1	Radish	0	1000	0	0	TRUE
Fertilizer Control	-1	Lettuce	2	1000	2000	3.301029996	FALSE
Fertilizer Control	-1	Radish	0	1000	0	0	TRUE
Fertilizer Control	-1	Lettuce	8	1000	8000	3.903089987	FALSE
Compost without ABX	-1	Lettuce	4	1000	4000	3.602059991	FALSE
Compost with ABX	-1	Radish	0	1000	0	0	TRUE
Compost with ABX	-1	Radish	0	1000	0	0	TRUE
Manure with ABX	-1	Lettuce	0	1000	0	0	TRUE
Manure with ABX	-1	Lettuce	4	1000	4000	3.602059991	FALSE
No Amendment Control	0	None	47	100	4700	3.672097858	FALSE
No Amendment Control	0	None	1	100	100	2	FALSE
No Amendment Control	0	None	10	100	1000	3	FALSE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	29	100	2900	3.462397998	FALSE
Fertilizer Control	0	Radish	5	100	500	2.698970004	FALSE
Fertilizer Control	0	Lettuce	3	100	300	2.477121255	FALSE
Fertilizer Control	0	Radish	2	100	200	2.301029996	FALSE
Fertilizer Control	0	Lettuce	3	100	300	2.477121255	FALSE
Compost without ABX	0	Radish	0	100	0	0	TRUE
Compost without ABX	0	Lettuce	3	100	300	2.477121255	FALSE
Compost without ABX	0	Radish	23	100	2300	3.361727836	FALSE
Compost without ABX	0	Lettuce	76	100	7600	3.880813592	FALSE
Compost without ABX	0	Radish	0	100	0	0	TRUE

Compost without ABX	0	Lettuce	0	100	0	0	TRUE
Compost with ABX	0	Radish	0	100	0	0	TRUE
Compost with ABX	0	Lettuce	0	100	0	0	TRUE
Compost with ABX	0	Radish	4	100	400	2.602059991	FALSE
Compost with ABX	0	Lettuce	2	100	200	2.301029996	FALSE
Compost with ABX	0	Radish	120	100	12000	4.079181246	FALSE
Compost with ABX	0	Lettuce	23	100	2300	3.361727836	FALSE
Manure with ABX	0	Radish	16	100	1600	3.204119983	FALSE
Manure with ABX	0	Lettuce	1	100	100	2	FALSE
Manure with ABX	0	Radish	210	100	21000	4.322219295	FALSE
Manure with ABX	0	Lettuce	16	100	1600	3.204119983	FALSE
Manure with ABX	0	Radish	11	100	1100	3.041392685	FALSE
Manure with ABX	0	Lettuce	1	1000	1000	3	FALSE
No Amendment Control	0	None	75	100	7500	3.875061263	FALSE
No Amendment Control	0	None	1	100	100	2	FALSE
No Amendment Control	0	None	30	100	3000	3.477121255	FALSE
Fertilizer Control	0	Radish	1	100	100	2	FALSE
Fertilizer Control	0	Lettuce	23	100	2300	3.361727836	FALSE
Fertilizer Control	0	Radish	2	100	200	2.301029996	FALSE
Fertilizer Control	0	Lettuce	1	100	100	2	FALSE
Fertilizer Control	0	Radish	2	100	200	2.301029996	FALSE
Fertilizer Control	0	Lettuce	0	100	0	0	TRUE
Compost without ABX	0	Radish	0	100	0	0	TRUE
Compost without ABX	0	Lettuce	2	100	200	2.301029996	FALSE
Compost without ABX	0	Radish	24	100	2400	3.380211242	FALSE
Compost without ABX	0	Lettuce	74	100	7400	3.86923172	FALSE
Compost without ABX	0	Radish	1	100	100	2	FALSE

Compost without ABX	0	Lettuce	0	100	0	0	TRUE
Compost with ABX	0	Radish	1	100	100	2	FALSE
Compost with ABX	0	Lettuce	0	100	0	0	TRUE
Compost with ABX	0	Radish	4	100	400	2.602059991	FALSE
Compost with ABX	0	Lettuce	0	100	0	0	TRUE
Compost with ABX	0	Radish	273	100	27300	4.436162647	FALSE
Compost with ABX	0	Lettuce	12	100	1200	3.079181246	FALSE
Manure with ABX	0	Radish	16	100	1600	3.204119983	FALSE
Manure with ABX	0	Lettuce	210	100	21000	4.322219295	FALSE
Manure with ABX	0	Radish	75	100	7500	3.875061263	FALSE
Manure with ABX	0	Lettuce	22	100	2200	3.342422681	FALSE
Manure with ABX	0	Radish	170	100	17000	4.230448921	FALSE
Manure with ABX	0	Lettuce	1	1000	1000	3	FALSE
No Amendment Control	0	None	75	100	7500	3.875061263	FALSE
No Amendment Control	0	None	0	100	0	0	TRUE
No Amendment Control	0	None	16	100	1600	3.204119983	FALSE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	34	100	3400	3.531478917	FALSE
Fertilizer Control	0	Radish	4	100	400	2.602059991	FALSE
Fertilizer Control	0	Lettuce	1	100	100	2	FALSE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	0	100	0	0	TRUE
Compost without ABX	0	Radish	0	100	0	0	TRUE
Compost without ABX	0	Lettuce	3	100	300	2.477121255	FALSE
Compost without ABX	0	Radish	19	100	1900	3.278753601	FALSE
Compost without ABX	0	Lettuce	56	100	5600	3.748188027	FALSE
Compost without ABX	0	Radish	2	100	200	2.301029996	FALSE

Compost without ABX	0	Lettuce	11	100	1100	3.041392685	FALSE
Compost with ABX	0	Radish	1	100	100	2	FALSE
Compost with ABX	0	Lettuce	8	100	800	2.903089987	FALSE
Compost with ABX	0	Radish	0	100	0	0	TRUE
Compost with ABX	0	Lettuce	2	100	200	2.301029996	FALSE
Compost with ABX	0	Radish	110	100	11000	4.041392685	FALSE
Compost with ABX	0	Lettuce	200	100	20000	4.301029996	FALSE
Manure with ABX	0	Radish	276	100	27600	4.440909082	FALSE
Manure with ABX	0	Lettuce	110	100	11000	4.041392685	FALSE
Manure with ABX	0	Radish	140	100	14000	4.146128036	FALSE
Manure with ABX	0	Lettuce	7	100	700	2.84509804	FALSE
Manure with ABX	0	Radish	360	100	36000	4.556302501	FALSE
Manure with ABX	0	Lettuce	0	1000	0	0	TRUE
No Amendment Control	7	None	0	1000	0	0	TRUE
No Amendment Control	7	None	1	1000	1000	3	FALSE
No Amendment Control	7	None	1	1000	1000	3	FALSE
Fertilizer Control	7	Radish	0	1000	0	0	TRUE
Fertilizer Control	7	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	7	Radish	2	1000	2000	3.301029996	FALSE
Fertilizer Control	7	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	7	Radish	0	1000	0	0	TRUE
Fertilizer Control	7	Lettuce	0	1000	0	0	TRUE
Compost without ABX	7	Radish	0	1000	0	0	TRUE
Compost without ABX	7	Lettuce	9	1000	9000	3.954242509	FALSE
Compost without ABX	7	Radish	0	1000	0	0	TRUE
Compost without ABX	7	Lettuce	4	1000	4000	3.602059991	FALSE
Compost without ABX	7	Radish	3	1000	3000	3.477121255	FALSE

Compost without ABX	7	Lettuce	3	1000	3000	3.477121255	FALSE
Compost with ABX	7	Radish	0	1000	0	0	TRUE
Compost with ABX	7	Lettuce	0	1000	0	0	TRUE
Compost with ABX	7	Radish	0	1000	0	0	TRUE
Compost with ABX	7	Lettuce	0	1000	0	0	TRUE
Compost with ABX	7	Radish	0	1000	0	0	TRUE
Compost with ABX	7	Lettuce	0	1000	0	0	TRUE
Manure with ABX	7	Radish	5	1000	5000	3.698970004	FALSE
Manure with ABX	7	Lettuce	22	1000	22000	4.342422681	FALSE
Manure with ABX	7	Radish	27	1000	27000	4.431363764	FALSE
Manure with ABX	7	Lettuce	2	1000	2000	3.301029996	FALSE
Manure with ABX	7	Radish	8	1000	8000	3.903089987	FALSE
Manure with ABX	7	Lettuce	1	1000	1000	3	FALSE
No Amendment Control	7	None	0	1000	0	0	TRUE
No Amendment Control	7	None	0	1000	0	0	TRUE
No Amendment Control	7	None	0	1000	0	0	TRUE
Fertilizer Control	7	Radish	2	1000	2000	3.301029996	FALSE
Fertilizer Control	7	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	7	Radish	0	1000	0	0	TRUE
Fertilizer Control	7	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	7	Radish	0	1000	0	0	TRUE
Fertilizer Control	7	Lettuce	0	1000	0	0	TRUE
Compost without ABX	7	Radish	0	1000	0	0	TRUE
Compost without ABX	7	Lettuce	4	1000	4000	3.602059991	FALSE
Compost without ABX	7	Radish	0	1000	0	0	TRUE
Compost without ABX	7	Lettuce	6	1000	6000	3.77815125	FALSE
Compost without ABX	7	Radish	4	1000	4000	3.602059991	FALSE

Compost without ABX	7	Lettuce	0	1000	0	0	TRUE
Compost with ABX	7	Radish	0	1000	0	0	TRUE
Compost with ABX	7	Lettuce	0	1000	0	0	TRUE
Compost with ABX	7	Radish	0	1000	0	0	TRUE
Compost with ABX	7	Lettuce	0	1000	0	0	TRUE
Compost with ABX	7	Radish	0	1000	0	0	TRUE
Compost with ABX	7	Lettuce	0	1000	0	0	TRUE
Manure with ABX	7	Radish	3	1000	3000	3.477121255	FALSE
Manure with ABX	7	Lettuce	5	1000	5000	3.698970004	FALSE
Manure with ABX	7	Radish	7	1000	7000	3.84509804	FALSE
Manure with ABX	7	Lettuce	2	1000	2000	3.301029996	FALSE
Manure with ABX	7	Radish	14	1000	14000	4.146128036	FALSE
Manure with ABX	7	Lettuce	1	1000	1000	3	FALSE
No Amendment Control	7	None	0	1000	0	0	TRUE
No Amendment Control	7	None	0	1000	0	0	TRUE
No Amendment Control	7	None	1	1000	1000	3	FALSE
Fertilizer Control	7	Radish	1	1000	1000	3	FALSE
Fertilizer Control	7	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	7	Radish	2	1000	2000	3.301029996	FALSE
Fertilizer Control	7	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	7	Radish	0	1000	0	0	TRUE
Fertilizer Control	7	Lettuce	0	1000	0	0	TRUE
Compost without ABX	7	Radish	0	1000	0	0	TRUE
Compost without ABX	7	Lettuce	13	1000	13000	4.113943352	FALSE
Compost without ABX	7	Radish	0	1000	0	0	TRUE
Compost without ABX	7	Lettuce	1	1000	1000	3	FALSE
Compost without ABX	7	Radish	1	1000	1000	3	FALSE

Compost without ABX	7	Lettuce	0	1000	0	0	TRUE
Compost with ABX	7	Radish	0	1000	0	0	TRUE
Compost with ABX	7	Lettuce	0	1000	0	0	TRUE
Compost with ABX	7	Radish	0	1000	0	0	TRUE
Compost with ABX	7	Lettuce	0	1000	0	0	TRUE
Compost with ABX	7	Radish	3	1000	3000	3.477121255	FALSE
Compost with ABX	7	Lettuce	0	1000	0	0	TRUE
Manure with ABX	7	Radish	0	1000	0	0	TRUE
Manure with ABX	7	Lettuce	26	1000	26000	4.414973348	FALSE
Manure with ABX	7	Radish	7	1000	7000	3.84509804	FALSE
Manure with ABX	7	Lettuce	2	1000	2000	3.301029996	FALSE
Manure with ABX	7	Radish	9	1000	9000	3.954242509	FALSE
Manure with ABX	7	Lettuce	1	1000	1000	3	FALSE
No Amendment Control	28	None	3	1000	3000	3.477121255	FALSE
No Amendment Control	28	None	1	1000	1000	3	FALSE
No Amendment Control	28	None	38	1000	38000	4.579783597	FALSE
Fertilizer Control	28	Radish	25	1000	25000	4.397940009	FALSE
Fertilizer Control	28	Lettuce	6	1000	6000	3.77815125	FALSE
Fertilizer Control	28	Radish	0	1000	0	0	TRUE
Fertilizer Control	28	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	28	Radish	3	1000	3000	3.477121255	FALSE
Fertilizer Control	28	Lettuce	0	1000	0	0	TRUE
Compost without ABX	28	Radish	1	1000	1000	3	FALSE
Compost without ABX	28	Lettuce	7	1000	7000	3.84509804	FALSE
Compost without ABX	28	Radish	3	1000	3000	3.477121255	FALSE
Compost without ABX	28	Lettuce	0	1000	0	0	TRUE
Compost without ABX	28	Radish	1	1000	1000	3	FALSE

Compost without ABX	28	Lettuce	2	1000	2000	3.301029996	FALSE
Compost with ABX	28	Radish	5	1000	5000	3.698970004	FALSE
Compost with ABX	28	Lettuce	3	1000	3000	3.477121255	FALSE
Compost with ABX	28	Radish	0	1000	0	0	TRUE
Compost with ABX	28	Lettuce	9	1000	9000	3.954242509	FALSE
Compost with ABX	28	Radish	0	1000	0	0	TRUE
Compost with ABX	28	Lettuce	0	1000	0	0	TRUE
Manure with ABX	28	Radish	80	1000	80000	4.903089987	FALSE
Manure with ABX	28	Lettuce	0	1000	0	0	TRUE
Manure with ABX	28	Radish	0	1000	0	0	TRUE
Manure with ABX	28	Lettuce	1	1000	1000	3	FALSE
Manure with ABX	28	Radish	0	1000	0	0	TRUE
Manure with ABX	28	Lettuce	7	1000	7000	3.84509804	FALSE
No Amendment Control	28	None	0	1000	0	0	TRUE
No Amendment Control	28	None	0	1000	0	0	TRUE
No Amendment Control	28	None	0	1000	0	0	TRUE
Fertilizer Control	28	Radish	0	1000	0	0	TRUE
Fertilizer Control	28	Lettuce	8	1000	8000	3.903089987	FALSE
Fertilizer Control	28	Radish	0	1000	0	0	TRUE
Fertilizer Control	28	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	28	Radish	2	1000	2000	3.301029996	FALSE
Fertilizer Control	28	Lettuce	0	1000	0	0	TRUE
Compost without ABX	28	Radish	0	1000	0	0	TRUE
Compost without ABX	28	Lettuce	6	1000	6000	3.77815125	FALSE
Compost without ABX	28	Radish	0	1000	0	0	TRUE
Compost without ABX	28	Lettuce	0	1000	0	0	TRUE
Compost without ABX	28	Radish	1	1000	1000	3	FALSE

Compost without ABX	28	Lettuce	3	1000	3000	3.477121255	FALSE
Compost with ABX	28	Radish	1	1000	1000	3	FALSE
Compost with ABX	28	Lettuce	5	1000	5000	3.698970004	FALSE
Compost with ABX	28	Radish	0	1000	0	0	TRUE
Compost with ABX	28	Lettuce	31	1000	31000	4.491361694	FALSE
Compost with ABX	28	Radish	0	1000	0	0	TRUE
Compost with ABX	28	Lettuce	12	1000	12000	4.079181246	FALSE
Manure with ABX	28	Radish	25	1000	25000	4.397940009	FALSE
Manure with ABX	28	Lettuce	2	1000	2000	3.301029996	FALSE
Manure with ABX	28	Radish	0	1000	0	0	TRUE
Manure with ABX	28	Lettuce	1	1000	1000	3	FALSE
Manure with ABX	28	Radish	42	1000	42000	4.62324929	FALSE
Manure with ABX	28	Lettuce	4	1000	4000	3.602059991	FALSE
No Amendment Control	28	None	3	1000	3000	3.477121255	FALSE
No Amendment Control	28	None	0	1000	0	0	TRUE
No Amendment Control	28	None	0	1000	0	0	TRUE
Fertilizer Control	28	Radish	0	1000	0	0	TRUE
Fertilizer Control	28	Lettuce	14	1000	14000	4.146128036	FALSE
Fertilizer Control	28	Radish	0	1000	0	0	TRUE
Fertilizer Control	28	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	28	Radish	3	1000	3000	3.477121255	FALSE
Fertilizer Control	28	Lettuce	0	1000	0	0	TRUE
Compost without ABX	28	Radish	0	1000	0	0	TRUE
Compost without ABX	28	Lettuce	5	1000	5000	3.698970004	FALSE
Compost without ABX	28	Radish	0	1000	0	0	TRUE
Compost without ABX	28	Lettuce	0	1000	0	0	TRUE
Compost without ABX	28	Radish	1	1000	1000	3	FALSE

Compost without ABX	28	Lettuce	4	1000	4000	3.602059991	FALSE
Compost with ABX	28	Radish	5	1000	5000	3.698970004	FALSE
Compost with ABX	28	Lettuce	1	1000	1000	3	FALSE
Compost with ABX	28	Radish	0	1000	0	0	TRUE
Compost with ABX	28	Lettuce	1	1000	1000	3	FALSE
Compost with ABX	28	Radish	0	1000	0	0	TRUE
Compost with ABX	28	Lettuce	1	1000	1000	3	FALSE
Manure with ABX	28	Radish	15	1000	15000	4.176091259	FALSE
Manure with ABX	28	Lettuce	0	1000	0	0	TRUE
Manure with ABX	28	Radish	0	1000	0	0	TRUE
Manure with ABX	28	Lettuce	0	1000	0	0	TRUE
Manure with ABX	28	Radish	1	1000	1000	3	FALSE
Manure with ABX	28	Lettuce	8	1000	8000	3.903089987	FALSE
No Amendment Control	42	None	0	1000	0	0	TRUE
No Amendment Control	42	None	0	1000	0	0	TRUE
No Amendment Control	42	None	0	1000	0	0	TRUE
Fertilizer Control	42	Radish	34	1000	34000	4.531478917	FALSE
Fertilizer Control	42	Lettuce	29	1000	39000	4.591064607	FALSE
Fertilizer Control	42	Radish	0	1000	0	0	TRUE
Fertilizer Control	42	Lettuce	7	1000	7000	3.84509804	FALSE
Fertilizer Control	42	Radish	0	1000	0	0	TRUE
Fertilizer Control	42	Lettuce	46	1000	46000	4.662757832	FALSE
Compost without ABX	42	Radish	99	1000	99000	4.995635195	FALSE
Compost without ABX	42	Lettuce	0	1000	0	0	TRUE
Compost without ABX	42	Radish	3	1000	3000	3.477121255	FALSE
Compost without ABX	42	Lettuce	0	1000	0	0	TRUE
Compost without ABX	42	Radish	34	1000	34000	4.531478917	FALSE

Compost without ABX	42	Lettuce	8	1000	8000	3.903089987	FALSE
Compost with ABX	42	Radish	8	1000	8000	3.903089987	FALSE
Compost with ABX	42	Lettuce	7	1000	7000	3.84509804	FALSE
Compost with ABX	42	Radish	0	1000	0	0	TRUE
Compost with ABX	42	Lettuce	0	1000	0	0	TRUE
Compost with ABX	42	Radish	0	1000	0	0	TRUE
Compost with ABX	42	Lettuce	0	1000	0	0	TRUE
Manure with ABX	42	Radish	0	1000	0	0	TRUE
Manure with ABX	42	Lettuce	108	1000	108000	5.033423755	FALSE
Manure with ABX	42	Radish	1	1000	1000	3	FALSE
Manure with ABX	42	Lettuce	3	1000	3000	3.477121255	FALSE
Manure with ABX	42	Radish	16	1000	16000	4.204119983	FALSE
Manure with ABX	42	Lettuce	42	1000	42000	4.62324929	FALSE
No Amendment Control	42	None	2	1000	2000	3.301029996	FALSE
No Amendment Control	42	None	1	1000	1000	3	FALSE
No Amendment Control	42	None	0	1000	0	0	TRUE
Fertilizer Control	42	Radish	25	1000	25000	4.397940009	FALSE
Fertilizer Control	42	Lettuce	53	1000	53000	4.72427587	FALSE
Fertilizer Control	42	Radish	0	1000	0	0	TRUE
Fertilizer Control	42	Lettuce	23	1000	23000	4.361727836	FALSE
Fertilizer Control	42	Radish	0	1000	0	0	TRUE
Fertilizer Control	42	Lettuce	22	1000	22000	4.342422681	FALSE
Compost without ABX	42	Radish	29	1000	29000	4.462397998	FALSE
Compost without ABX	42	Lettuce	0	1000	0	0	TRUE
Compost without ABX	42	Radish	3	1000	3000	3.477121255	FALSE
Compost without ABX	42	Lettuce	0	1000	0	0	TRUE
Compost without ABX	42	Radish	15	1000	15000	4.176091259	FALSE

Compost without ABX	42	Lettuce	2	1000	2000	3.301029996	FALSE
Compost with ABX	42	Radish	2	1000	2000	3.301029996	FALSE
Compost with ABX	42	Lettuce	28	1000	28000	4.447158031	FALSE
Compost with ABX	42	Radish	0	1000	0	0	TRUE
Compost with ABX	42	Lettuce	0	1000	0	0	TRUE
Compost with ABX	42	Radish	0	1000	0	0	TRUE
Compost with ABX	42	Lettuce	0	1000	0	0	TRUE
Manure with ABX	42	Radish	29	1000	29000	4.462397998	FALSE
Manure with ABX	42	Lettuce	5	1000	5000	3.698970004	FALSE
Manure with ABX	42	Radish	3	1000	3000	3.477121255	FALSE
Manure with ABX	42	Lettuce	0	1000	0	0	TRUE
Manure with ABX	42	Radish	4	1000	4000	3.602059991	FALSE
Manure with ABX	42	Lettuce	36	1000	36000	4.556302501	FALSE
No Amendment Control	42	None	0	1000	0	0	TRUE
No Amendment Control	42	None	0	1000	0	0	TRUE
No Amendment Control	42	None	0	1000	0	0	TRUE
Fertilizer Control	42	Radish	68	1000	68000	4.832508913	FALSE
Fertilizer Control	42	Lettuce	66	1000	66000	4.819543936	FALSE
Fertilizer Control	42	Radish	0	1000	0	0	TRUE
Fertilizer Control	42	Lettuce	1	1000	1000	3	FALSE
Fertilizer Control	42	Radish	0	1000	0	0	TRUE
Fertilizer Control	42	Lettuce	0	1000	0	0	TRUE
Compost without ABX	42	Radish	4	1000	4000	3.602059991	FALSE
Compost without ABX	42	Lettuce	0	1000	0	0	TRUE
Compost without ABX	42	Radish	9	1000	9000	3.954242509	FALSE
Compost without ABX	42	Lettuce	0	1000	0	0	TRUE
Compost without ABX	42	Radish	7	1000	7000	3.84509804	FALSE

Compost without ABX	42	Lettuce	0	1000	0	0	TRUE
Compost with ABX	42	Radish	0	1000	0	0	TRUE
Compost with ABX	42	Lettuce	8	1000	8000	3.903089987	FALSE
Compost with ABX	42	Radish	0	1000	0	0	TRUE
Compost with ABX	42	Lettuce	2	1000	2000	3.301029996	FALSE
Compost with ABX	42	Radish	0	1000	0	0	TRUE
Compost with ABX	42	Lettuce	0	1000	0	0	TRUE
Manure with ABX	42	Radish	0	1000	0	0	TRUE
Manure with ABX	42	Lettuce	33	1000	33000	4.51851394	FALSE
Manure with ABX	42	Radish	2	1000	2000	3.301029996	FALSE
Manure with ABX	42	Lettuce	0	1000	0	0	TRUE
Manure with ABX	42	Radish	3	1000	3000	3.477121255	FALSE
Manure with ABX	42	Lettuce	0	1000	0	0	TRUE
No Amendment Control	56	None	1	1000	1000	3	FALSE
No Amendment Control	56	None	0	1000	0	0	TRUE
No Amendment Control	56	None	1	1000	1000	3	FALSE
Fertilizer Control	56	Radish	4	1000	4000	3.602059991	FALSE
Fertilizer Control	56	Lettuce	34	1000	34000	4.531478917	FALSE
Fertilizer Control	56	Radish	0	1000	0	0	TRUE
Fertilizer Control	56	Lettuce	33	1000	33000	4.51851394	FALSE
Fertilizer Control	56	Radish	0	1000	0	0	TRUE
Fertilizer Control	56	Lettuce	2	1000	2000	3.301029996	FALSE
Compost without ABX	56	Radish	0	1000	0	0	TRUE
Compost without ABX	56	Lettuce	11	1000	11000	4.041392685	FALSE
Compost without ABX	56	Radish	41	1000	41000	4.612783857	FALSE
Compost without ABX	56	Lettuce	11	1000	11000	4.041392685	FALSE
Compost without ABX	56	Radish	36	1000	36000	4.556302501	FALSE

Compost without ABX	56	Lettuce	3	1000	3000	3.477121255	FALSE
Compost with ABX	56	Radish	110	1000	110000	5.041392685	FALSE
Compost with ABX	56	Lettuce	0	1000	0	0	TRUE
Compost with ABX	56	Radish	110	1000	110000	5.041392685	FALSE
Compost with ABX	56	Lettuce	4	1000	4000	3.602059991	FALSE
Compost with ABX	56	Radish	2	1000	2000	3.301029996	FALSE
Compost with ABX	56	Lettuce	200	1000	200000	5.301029996	FALSE
Manure with ABX	56	Radish	0	1000	0	0	TRUE
Manure with ABX	56	Lettuce	1	1000	1000	3	FALSE
Manure with ABX	56	Radish	0	1000	0	0	TRUE
Manure with ABX	56	Lettuce	0	1000	0	0	TRUE
Manure with ABX	56	Radish	2	1000	2000	3.301029996	FALSE
Manure with ABX	56	Lettuce	1	1000	1000	3	FALSE
No Amendment Control	56	None	0	1000	0	0	TRUE
No Amendment Control	56	None	0	1000	0	0	TRUE
No Amendment Control	56	None	0	1000	0	0	TRUE
Fertilizer Control	56	Radish	21	1000	21000	4.322219295	FALSE
Fertilizer Control	56	Lettuce	54	1000	54000	4.73239376	FALSE
Fertilizer Control	56	Radish	0	1000	0	0	TRUE
Fertilizer Control	56	Lettuce	1	1000	1000	3	FALSE
Fertilizer Control	56	Radish	0	1000	0	0	TRUE
Fertilizer Control	56	Lettuce	5	1000	5000	3.698970004	FALSE
Compost without ABX	56	Radish	0	1000	0	0	TRUE
Compost without ABX	56	Lettuce	23	1000	23000	4.361727836	FALSE
Compost without ABX	56	Radish	79	1000	79000	4.897627091	FALSE
Compost without ABX	56	Lettuce	1	1000	1000	3	FALSE
Compost without ABX	56	Radish	5	1000	5000	3.698970004	FALSE

Compost without ABX	56	Lettuce	10	1000	10000	4	FALSE
Compost with ABX	56	Radish	140	1000	140000	5.146128036	FALSE
Compost with ABX	56	Lettuce	1	1000	1000	3	FALSE
Compost with ABX	56	Radish	0	1000	0	0	TRUE
Compost with ABX	56	Lettuce	0	1000	0	0	TRUE
Compost with ABX	56	Radish	2	1000	2000	3.301029996	FALSE
Compost with ABX	56	Lettuce	165	1000	165000	5.217483944	FALSE
Manure with ABX	56	Radish	0	1000	0	0	TRUE
Manure with ABX	56	Lettuce	0	1000	0	0	TRUE
Manure with ABX	56	Radish	0	1000	0	0	TRUE
Manure with ABX	56	Lettuce	0	1000	0	0	TRUE
Manure with ABX	56	Radish	65	1000	65000	4.812913357	FALSE
Manure with ABX	56	Lettuce	0	1000	0	0	TRUE
No Amendment Control	56	None	3	1000	3000	3.477121255	FALSE
No Amendment Control	56	None	0	1000	0	0	TRUE
No Amendment Control	56	None	0	1000	0	0	TRUE
Fertilizer Control	56	Radish	23	1000	23000	4.361727836	FALSE
Fertilizer Control	56	Lettuce	86	1000	86000	4.934498451	FALSE
Fertilizer Control	56	Radish	0	1000	0	0	TRUE
Fertilizer Control	56	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	56	Radish	0	1000	0	0	TRUE
Fertilizer Control	56	Lettuce	2	1000	2000	3.301029996	FALSE
Compost without ABX	56	Radish	3	1000	3000	3.477121255	FALSE
Compost without ABX	56	Lettuce	7	1000	7000	3.84509804	FALSE
Compost without ABX	56	Radish	27	1000	27000	4.431363764	FALSE
Compost without ABX	56	Lettuce	1	1000	1000	3	FALSE
Compost without ABX	56	Radish	5	1000	5000	3.698970004	FALSE

Compost without ABX	56	Lettuce	7	1000	7000	3.84509804	FALSE
Compost with ABX	56	Radish	0	1000	0	0	TRUE
Compost with ABX	56	Lettuce	0	1000	0	0	TRUE
Compost with ABX	56	Radish	17	1000	17000	4.230448921	FALSE
Compost with ABX	56	Lettuce	0	1000	0	0	TRUE
Compost with ABX	56	Radish	2	1000	2000	3.301029996	FALSE
Compost with ABX	56	Lettuce	20	1000	20000	4.301029996	FALSE
Manure with ABX	56	Radish	0	1000	0	0	TRUE
Manure with ABX	56	Lettuce	12	1000	12000	4.079181246	FALSE
Manure with ABX	56	Radish	0	1000	0	0	TRUE
Manure with ABX	56	Lettuce	18	1000	18000	4.255272505	FALSE
Manure with ABX	56	Radish	0	1000	0	0	TRUE
Manure with ABX	56	Lettuce	0	1000	0	0	TRUE
No Amendment Control	90	None	0	1000	0	0	TRUE
No Amendment Control	90	None	39	1000	39000	4.591064607	FALSE
No Amendment Control	90	None	15	1000	15000	4.176091259	FALSE
Fertilizer Control	90	Radish	192	1000	192000	5.283301229	FALSE
Fertilizer Control	90	Lettuce	3	1000	3000	3.477121255	FALSE
Fertilizer Control	90	Radish	109	1000	109000	5.037426498	FALSE
Fertilizer Control	90	Lettuce	6	1000	6000	3.77815125	FALSE
Fertilizer Control	90	Radish	115	1000	115000	5.06069784	FALSE
Fertilizer Control	90	Lettuce	7	1000	7000	3.84509804	FALSE
Compost without ABX	90	Radish	57	1000	57000	4.755874856	FALSE
Compost without ABX	90	Lettuce	32	1000	32000	4.505149978	FALSE
Compost without ABX	90	Radish	52	1000	52000	4.716003344	FALSE
Compost without ABX	90	Lettuce	13	1000	13000	4.113943352	FALSE
Compost without ABX	90	Radish	280	1000	280000	5.447158031	FALSE

Compost without ABX	90	Lettuce	17	1000	17000	4.230448921	FALSE
Compost with ABX	90	Radish	10	1000	10000	4	FALSE
Compost with ABX	90	Lettuce	540	1000	540000	5.73239376	FALSE
Compost with ABX	90	Radish	91	1000	91000	4.959041392	FALSE
Compost with ABX	90	Lettuce	320	1000	320000	5.505149978	FALSE
Compost with ABX	90	Radish	64	1000	64000	4.806179974	FALSE
Compost with ABX	90	Lettuce	22	1000	22000	4.342422681	FALSE
Manure with ABX	90	Radish	11	1000	11000	4.041392685	FALSE
Manure with ABX	90	Lettuce	55	1000	55000	4.740362689	FALSE
Manure with ABX	90	Radish	0	1000	0	0	TRUE
Manure with ABX	90	Lettuce	249	1000	249000	5.396199347	FALSE
Manure with ABX	90	Radish	121	1000	121000	5.08278537	FALSE
Manure with ABX	90	Lettuce	0	1000	0	0	TRUE
No Amendment Control	90	None	2	1000	2000	3.301029996	FALSE
No Amendment Control	90	None	4	1000	4000	3.602059991	FALSE
No Amendment Control	90	None	3	1000	3000	3.477121255	FALSE
Fertilizer Control	90	Radish	102	1000	102000	5.008600172	FALSE
Fertilizer Control	90	Lettuce	16	1000	16000	4.204119983	FALSE
Fertilizer Control	90	Radish	59	1000	59000	4.770852012	FALSE
Fertilizer Control	90	Lettuce	2	1000	2000	3.301029996	FALSE
Fertilizer Control	90	Radish	106	1000	106000	5.025305865	FALSE
Fertilizer Control	90	Lettuce	14	1000	14000	4.146128036	FALSE
Compost without ABX	90	Radish	5	1000	5000	3.698970004	FALSE
Compost without ABX	90	Lettuce	69	1000	69000	4.838849091	FALSE
Compost without ABX	90	Radish	41	1000	41000	4.612783857	FALSE
Compost without ABX	90	Lettuce	12	1000	12000	4.079181246	FALSE
Compost without ABX	90	Radish	440	1000	440000	5.643452676	FALSE

Compost without ABX	90	Lettuce	78	1000	78000	4.892094603	FALSE
Compost with ABX	90	Radish	115	1000	115000	5.06069784	FALSE
Compost with ABX	90	Lettuce	320	1000	320000	5.505149978	FALSE
Compost with ABX	90	Radish	232	1000	232000	5.365487985	FALSE
Compost with ABX	90	Lettuce	380	1000	380000	5.579783597	FALSE
Compost with ABX	90	Radish	80	1000	80000	4.903089987	FALSE
Compost with ABX	90	Lettuce	10	1000	10000	4	FALSE
Manure with ABX	90	Radish	32	1000	32000	4.505149978	FALSE
Manure with ABX	90	Lettuce	25	1000	25000	4.397940009	FALSE
Manure with ABX	90	Radish	0	1000	0	0	TRUE
Manure with ABX	90	Lettuce	220	1000	220000	5.342422681	FALSE
Manure with ABX	90	Radish	200	1000	200000	5.301029996	FALSE
Manure with ABX	90	Lettuce	23	1000	23000	4.361727836	FALSE
No Amendment Control	90	None	0	1000	0	0	TRUE
No Amendment Control	90	None	4	1000	4000	3.602059991	FALSE
No Amendment Control	90	None	71	1000	71000	4.851258349	FALSE
Fertilizer Control	90	Radish	89	1000	89000	4.949390007	FALSE
Fertilizer Control	90	Lettuce	43	1000	43000	4.633468456	FALSE
Fertilizer Control	90	Radish	20	1000	20000	4.301029996	FALSE
Fertilizer Control	90	Lettuce	7	1000	7000	3.84509804	FALSE
Fertilizer Control	90	Radish	125	1000	125000	5.096910013	FALSE
Fertilizer Control	90	Lettuce	12	1000	12000	4.079181246	FALSE
Compost without ABX	90	Radish	44	1000	44000	4.643452676	FALSE
Compost without ABX	90	Lettuce	25	1000	25000	4.397940009	FALSE
Compost without ABX	90	Radish	17	1000	17000	4.230448921	FALSE
Compost without ABX	90	Lettuce	8	1000	8000	3.903089987	FALSE
Compost without ABX	90	Radish	440	1000	440000	5.643452676	FALSE

Compost without ABX	90	Lettuce	18	1000	18000	4.255272505	FALSE
Compost with ABX	90	Radish	68	1000	68000	4.832508913	FALSE
Compost with ABX	90	Lettuce	260	1000	260000	5.414973348	FALSE
Compost with ABX	90	Radish	145	1000	145000	5.161368002	FALSE
Compost with ABX	90	Lettuce	420	1000	420000	5.62324929	FALSE
Compost with ABX	90	Radish	80	1000	80000	4.903089987	FALSE
Compost with ABX	90	Lettuce	8	1000	8000	3.903089987	FALSE
Manure with ABX	90	Radish	96	1000	96000	4.982271233	FALSE
Manure with ABX	90	Lettuce	7	1000	7000	3.84509804	FALSE
Manure with ABX	90	Radish	2	1000	2000	3.301029996	FALSE
Manure with ABX	90	Lettuce	167	1000	167000	5.222716471	FALSE
Manure with ABX	90	Radish	160	1000	160000	5.204119983	FALSE
Manure with ABX	90	Lettuce	2	1000	2000	3.301029996	FALSE
No Amendment Control	120	None	2	1000	2000	3.301029996	FALSE
No Amendment Control	120	None	6	1000	6000	3.77815125	FALSE
No Amendment Control	120	None	2	1000	2000	3.301029996	FALSE
Fertilizer Control	120	Radish	2	1000	2000	3.301029996	FALSE
Fertilizer Control	120	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	120	Radish	0	1000	0	0	TRUE
Fertilizer Control	120	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	120	Radish	1	1000	1000	3	FALSE
Fertilizer Control	120	Lettuce	1	1000	1000	3	FALSE
Compost without ABX	120	Radish	4	1000	4000	3.602059991	FALSE
Compost without ABX	120	Lettuce	0	1000	0	0	TRUE
Compost without ABX	120	Radish	4	10000	4000	3.602059991	FALSE
Compost without ABX	120	Lettuce	21	1000	210000	5.322219295	FALSE
Compost without ABX	120	Radish	414	1000	414000	5.617000341	FALSE

Compost without ABX	120	Lettuce	4	1000	4000	3.602059991	FALSE
Compost with ABX	120	Radish	63	1000	63000	4.799340549	FALSE
Compost with ABX	120	Lettuce	4	1000	4000	3.602059991	FALSE
Compost with ABX	120	Radish	19	1000	19000	4.278753601	FALSE
Compost with ABX	120	Lettuce	2	1000	2000	3.301029996	FALSE
Compost with ABX	120	Radish	0	1000	0	0	TRUE
Compost with ABX	120	Lettuce	175	1000	175000	5.243038049	FALSE
Manure with ABX	120	Radish	17	1000	17000	4.230448921	FALSE
Manure with ABX	120	Lettuce	4	1000	4000	3.602059991	FALSE
Manure with ABX	120	Radish	1	1000	1000	3	FALSE
Manure with ABX	120	Lettuce	33	1000	33000	4.51851394	FALSE
Manure with ABX	120	Radish	1	1000	1000	3	FALSE
Manure with ABX	120	Lettuce	1	1000	1000	3	FALSE
No Amendment Control	120	None	3	1000	3000	3.477121255	FALSE
No Amendment Control	120	None	2	1000	2000	3.301029996	FALSE
No Amendment Control	120	None	1	1000	1000	3	FALSE
Fertilizer Control	120	Radish	1	1000	1000	3	FALSE
Fertilizer Control	120	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	120	Radish	0	1000	0	0	TRUE
Fertilizer Control	120	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	120	Radish	2	1000	2000	3.301029996	FALSE
Fertilizer Control	120	Lettuce	1	1000	1000	3	FALSE
Compost without ABX	120	Radish	12	1000	12000	4.079181246	FALSE
Compost without ABX	120	Lettuce	0	1000	0	0	TRUE
Compost without ABX	120	Radish	8	1000	8000	3.903089987	FALSE
Compost without ABX	120	Lettuce	28	10000	176000	5.245512668	FALSE
Compost without ABX	120	Radish	245	1000	245000	5.389166084	FALSE

Compost without ABX	120	Lettuce	22	1000	22000	4.342422681	FALSE
Compost with ABX	120	Radish	3	1000	3000	3.477121255	FALSE
Compost with ABX	120	Lettuce	1	1000	1000	3	FALSE
Compost with ABX	120	Radish	73	1000	73000	4.86332286	FALSE
Compost with ABX	120	Lettuce	182	1000	182000	5.260071388	FALSE
Compost with ABX	120	Radish	0	1000	0	0	TRUE
Compost with ABX	120	Lettuce	100	1000	100000	5	FALSE
Manure with ABX	120	Radish	12	1000	12000	4.079181246	FALSE
Manure with ABX	120	Lettuce	7	1000	7000	3.84509804	FALSE
Manure with ABX	120	Radish	0	1000	0	0	TRUE
Manure with ABX	120	Lettuce	10	1000	10000	4	FALSE
Manure with ABX	120	Radish	1	1000	1000	3	FALSE
Manure with ABX	120	Lettuce	0	1000	0	0	TRUE
No Amendment Control	120	None	6	1000	6000	3.77815125	FALSE
No Amendment Control	120	None	1	1000	1000	3	FALSE
No Amendment Control	120	None	0	1000	0	0	TRUE
Fertilizer Control	120	Radish	0	1000	0	0	TRUE
Fertilizer Control	120	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	120	Radish	1	1000	1000	3	FALSE
Fertilizer Control	120	Lettuce	0	1000	0	0	TRUE
Fertilizer Control	120	Radish	0	1000	0	0	TRUE
Fertilizer Control	120	Lettuce	9	1000	9000	3.954242509	FALSE
Compost without ABX	120	Radish	13	1000	13000	4.113943352	FALSE
Compost without ABX	120	Lettuce	1	1000	1000	3	FALSE
Compost without ABX	120	Radish	21	1000	21000	4.322219295	FALSE
Compost without ABX	120	Lettuce	42	10000	420000	5.62324929	FALSE
Compost without ABX	120	Radish	173	1000	173000	5.238046103	FALSE

Compost without ABX	120	Lettuce	7	1000	7000	3.84509804	FALSE
Compost with ABX	120	Radish	7	1000	7000	3.84509804	FALSE
Compost with ABX	120	Lettuce	2	1000	2000	3.301029996	FALSE
Compost with ABX	120	Radish	2	1000	2000	3.301029996	FALSE
Compost with ABX	120	Lettuce	17	1000	17000	4.230448921	FALSE
Compost with ABX	120	Radish	0	1000	0	0	TRUE
Compost with ABX	120	Lettuce	54	1000	54000	4.73239376	FALSE
Manure with ABX	120	Radish	12	1000	12000	4.079181246	FALSE
Manure with ABX	120	Lettuce	32	1000	32000	4.505149978	FALSE
Manure with ABX	120	Radish	0	1000	0	0	TRUE
Manure with ABX	120	Lettuce	3	1000	3000	3.477121255	FALSE
Manure with ABX	120	Radish	0	1000	0	0	TRUE
Manure with ABX	120	Lettuce	13	1000	13000	4.113943352	FALSE

APPENDIX K. Raw Data: Colony Counts from Clindamycin MacConkey Agar Plates for entire study.

Table K.1. Table I.1. Colony counts, dilution, and CFU's for Day -1, 0, 7, 28, 42, 56, 90, and 120 Clindamycin Plates.

Treatment	Time	Vegetable	Colonies Counted	Dilution Factor	CFU E. coli/ g soil	log10 CFU E. coli/ g soil	Censored CFU
No Amendment Control	-1	None	0	10	0	0	TRUE
No Amendment Control	-1	None	0	10	0	0	TRUE
No Amendment Control	-1	None	0	10	0	0	TRUE
Fertilizer Control	-1	Radish	0	10	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	10	0	0	TRUE
Fertilizer Control	-1	Radish	0	10	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	10	0	0	TRUE
Fertilizer Control	-1	Radish	0	10	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	10	0	0	TRUE
Compost without ABX	-1	Radish	0	10	0	0	TRUE
Compost without ABX	-1	Lettuce	0	10	0	0	TRUE
Compost without ABX	-1	Radish	0	10	0	0	TRUE
Compost without ABX	-1	Lettuce	0	10	0	0	TRUE
Compost without ABX	-1	Radish	0	10	0	0	TRUE
Compost without ABX	-1	Lettuce	0	10	0	0	TRUE
Compost with ABX	-1	Radish	0	10	0	0	TRUE
Compost with ABX	-1	Lettuce	0	10	0	0	TRUE
Compost with ABX	-1	Radish	0	10	0	0	TRUE
Compost with ABX	-1	Lettuce	0	10	0	0	TRUE
Compost with ABX	-1	Radish	0	10	0	0	TRUE
Compost with ABX	-1	Lettuce	0	10	0	0	TRUE
Manure with ABX	-1	Radish	0	10	0	0	TRUE

Manure with ABX	-1	Lettuce	0	10	0	0	TRUE
Manure with ABX	-1	Radish	0	10	0	0	TRUE
Manure with ABX	-1	Lettuce	0	10	0	0	TRUE
Manure with ABX	-1	Radish	0	10	0	0	TRUE
Manure with ABX	-1	Lettuce	0	10	0	0	TRUE
No Amendment Control	-1	None	0	10	0	0	TRUE
No Amendment Control	-1	None	0	10	0	0	TRUE
No Amendment Control	-1	None	0	10	0	0	TRUE
Fertilizer Control	-1	Radish	0	10	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	10	0	0	TRUE
Fertilizer Control	-1	Radish	0	10	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	10	0	0	TRUE
Fertilizer Control	-1	Radish	0	10	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	10	0	0	TRUE
Compost without ABX	-1	Radish	0	10	0	0	TRUE
Compost without ABX	-1	Lettuce	0	10	0	0	TRUE
Compost without ABX	-1	Radish	0	10	0	0	TRUE
Compost without ABX	-1	Lettuce	0	10	0	0	TRUE
Compost without ABX	-1	Radish	0	10	0	0	TRUE
Compost without ABX	-1	Lettuce	0	10	0	0	TRUE
Compost with ABX	-1	Radish	0	10	0	0	TRUE
Compost with ABX	-1	Lettuce	0	10	0	0	TRUE
Compost with ABX	-1	Radish	0	10	0	0	TRUE
Compost with ABX	-1	Lettuce	0	10	0	0	TRUE
Compost with ABX	-1	Radish	0	10	0	0	TRUE
Compost with ABX	-1	Lettuce	0	10	0	0	TRUE
Manure with ABX	-1	Radish	0	10	0	0	TRUE

Manure with ABX	-1	Lettuce	0	10	0	0	TRUE
Manure with ABX	-1	Radish	0	10	0	0	TRUE
Manure with ABX	-1	Lettuce	0	10	0	0	TRUE
Manure with ABX	-1	Radish	0	10	0	0	TRUE
Manure with ABX	-1	Lettuce	0	10	0	0	TRUE
No Amendment Control	-1	None	0	10	0	0	TRUE
No Amendment Control	-1	None	0	10	0	0	TRUE
No Amendment Control	-1	None	0	10	0	0	TRUE
Fertilizer Control	-1	Radish	0	10	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	10	0	0	TRUE
Fertilizer Control	-1	Radish	0	10	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	10	0	0	TRUE
Fertilizer Control	-1	Radish	0	10	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	10	0	0	TRUE
Compost without ABX	-1	Radish	0	10	0	0	TRUE
Compost without ABX	-1	Lettuce	0	10	0	0	TRUE
Compost without ABX	-1	Radish	0	10	0	0	TRUE
Compost without ABX	-1	Lettuce	0	10	0	0	TRUE
Compost without ABX	-1	Radish	0	10	0	0	TRUE
Compost without ABX	-1	Lettuce	0	10	0	0	TRUE
Compost with ABX	-1	Radish	0	10	0	0	TRUE
Compost with ABX	-1	Lettuce	0	10	0	0	TRUE
Compost with ABX	-1	Radish	0	10	0	0	TRUE
Compost with ABX	-1	Lettuce	0	10	0	0	TRUE
Compost with ABX	-1	Radish	0	10	0	0	TRUE
Compost with ABX	-1	Lettuce	0	10	0	0	TRUE
Manure with ABX	-1	Radish	0	10	0	0	TRUE

Manure with ABX	-1	Lettuce	0	10	0	0	TRUE
Manure with ABX	-1	Radish	0	10	0	0	TRUE
Manure with ABX	-1	Lettuce	0	10	0	0	TRUE
Manure with ABX	-1	Radish	0	10	0	0	TRUE
Manure with ABX	-1	Lettuce	0	10	0	0	TRUE
No Amendment Control	0	None	0	100	0	0	TRUE
No Amendment Control	0	None	0	100	0	0	TRUE
No Amendment Control	0	None	0	100	0	0	TRUE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	0	100	0	0	TRUE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	2	100	200	2.301029996	FALSE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	0	100	0	0	TRUE
Compost without ABX	0	Radish	0	100	0	0	TRUE
Compost without ABX	0	Lettuce	0	100	0	0	TRUE
Compost without ABX	0	Radish	0	100	0	0	TRUE
Compost without ABX	0	Lettuce	0	100	0	0	TRUE
Compost without ABX	0	Radish	0	100	0	0	TRUE
Compost without ABX	0	Lettuce	0	100	0	0	TRUE
Compost with ABX	0	Radish	0	100	0	0	TRUE
Compost with ABX	0	Lettuce	15	100	1500	3.176091259	FALSE
Compost with ABX	0	Radish	8	100	800	2.903089987	FALSE
Compost with ABX	0	Lettuce	6	100	600	2.77815125	FALSE
Compost with ABX	0	Radish	13	100	1300	3.113943352	FALSE
Compost with ABX	0	Lettuce	0	100	0	0	TRUE
Manure with ABX	0	Radish	0	100	0	0	TRUE

Manure with ABX	0	Lettuce	44	100	4400	3.643452676	FALSE
Manure with ABX	0	Radish	25	100	2500	3.397940009	FALSE
Manure with ABX	0	Lettuce	0	100	0	0	TRUE
Manure with ABX	0	Radish	80	1000	80000	4.494154594	FALSE
Manure with ABX	0	Lettuce	20	100	2000	3.301029996	FALSE
No Amendment Control	0	None	3	100	300	2.477121255	FALSE
No Amendment Control	0	None	0	100		0	TRUE
No Amendment Control	0	None	0	100	0	0	TRUE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	0	100	0	0	TRUE
Fertilizer Control	0	Radish	1	100	100	2	FALSE
Fertilizer Control	0	Lettuce	1	100	100	2	FALSE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	0	100	0	0	TRUE
Compost without ABX	0	Radish	0	100	0	0	TRUE
Compost without ABX	0	Lettuce	0	100	0	0	TRUE
Compost without ABX	0	Radish	0	100	0	0	TRUE
Compost without ABX	0	Lettuce	0	100	0	0	TRUE
Compost without ABX	0	Radish	0	100	0	0	TRUE
Compost without ABX	0	Lettuce	0	100	0	0	TRUE
Compost with ABX	0	Radish	0	100	0	0	TRUE
Compost with ABX	0	Lettuce	0	100	0	0	TRUE
Compost with ABX	0	Radish	1	100	100	2	FALSE
Compost with ABX	0	Lettuce	0	100	0	0	TRUE
Compost with ABX	0	Radish	0	100	0	0	TRUE
Compost with ABX	0	Lettuce	0	100	0	0	TRUE
Manure with ABX	0	Radish	0	100	0	0	TRUE

Manure with ABX	0	Lettuce	23	100	2300	3.361727836	FALSE
Manure with ABX	0	Radish	26	100	2600	3.414973348	FALSE
Manure with ABX	0	Lettuce	65	100	6500	3.812913357	FALSE
Manure with ABX	0	Radish	47	1000	47000	4.672097858	TRUE
Manure with ABX	0	Lettuce	19	100	1900	3.278753601	FALSE
No Amendment Control	0	None	0	100	0	0	TRUE
No Amendment Control	0	None	0	100	0	0	TRUE
No Amendment Control	0	None	0	100	0	0	TRUE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	0	100	0	0	TRUE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	1	100	100	2	FALSE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	0	100	0	0	TRUE
Compost without ABX	0	Radish	0	100	0	0	TRUE
Compost without ABX	0	Lettuce	0	100	0	0	TRUE
Compost without ABX	0	Radish	0	100	0	0	TRUE
Compost without ABX	0	Lettuce	0	100	0	0	TRUE
Compost without ABX	0	Radish	0	100	0	0	TRUE
Compost without ABX	0	Lettuce	0	100	0	0	TRUE
Compost with ABX	0	Radish	0	100	0	0	TRUE
Compost with ABX	0	Lettuce	1	100	100	2	FALSE
Compost with ABX	0	Radish	7	100	700	2.84509804	FALSE
Compost with ABX	0	Lettuce	2	100	200	2.301029996	FALSE
Compost with ABX	0	Radish	0	100	0	0	TRUE
Compost with ABX	0	Lettuce	0	100	0	0	TRUE
Manure with ABX	0	Radish	7	100	700	2.84509804	FALSE

Manure with ABX	0	Lettuce	39	100	3900	3.591064607	FALSE
Manure with ABX	0	Radish	16	100	1600	3.204119983	FALSE
Manure with ABX	0	Lettuce	20	100	2000	3.301029996	FALSE
Manure with ABX	0	Radish	31	1000	31000	4.491361694	TRUE
Manure with ABX	0	Lettuce	35	100	3500	3.544068044	FALSE
No Amendment Control	7	None	0	10	0	0	TRUE
No Amendment Control	7	None	0	10	0	0	TRUE
No Amendment Control	7	None	0	10	0	0	TRUE
Fertilizer Control	7	Radish	0	10	0	0	TRUE
Fertilizer Control	7	Lettuce	0	10	0	0	TRUE
Fertilizer Control	7	Radish	0	10	0	0	TRUE
Fertilizer Control	7	Lettuce	0	10	0	0	TRUE
Fertilizer Control	7	Radish	0	10	0	0	TRUE
Fertilizer Control	7	Lettuce	0	10	0	0	TRUE
Compost without ABX	7	Radish	0	100	0	0	TRUE
Compost without ABX	7	Lettuce	1	100	100	2	FALSE
Compost without ABX	7	Radish	6	100	600	2.77815125	FALSE
Compost without ABX	7	Lettuce	0	100	0	0	TRUE
Compost without ABX	7	Radish	0	100	0	0	TRUE
Compost without ABX	7	Lettuce	0	100	0	0	TRUE
Compost with ABX	7	Radish	0	100	0	0	TRUE
Compost with ABX	7	Lettuce	0	100	0	0	TRUE
Compost with ABX	7	Radish	1	100	100	2	FALSE
Compost with ABX	7	Lettuce	0	100	0	0	TRUE
Compost with ABX	7	Radish	0	100	0	0	TRUE
Compost with ABX	7	Lettuce	0	100	0	0	TRUE
Manure with ABX	7	Radish	0	100	0	0	TRUE

Manure with ABX	7	Lettuce	0	100	0	0	TRUE
Manure with ABX	7	Radish	0	100	0	0	TRUE
Manure with ABX	7	Lettuce	0	100	0	0	TRUE
Manure with ABX	7	Radish	43	100	4300	3.633468456	FALSE
Manure with ABX	7	Lettuce	0	100	0	0	TRUE
No Amendment Control	7	None	0	10	0	0	TRUE
No Amendment Control	7	None	0	10	0	0	TRUE
No Amendment Control	7	None	0	10	0	0	TRUE
Fertilizer Control	7	Radish	0	10	0	0	TRUE
Fertilizer Control	7	Lettuce	0	10	0	0	TRUE
Fertilizer Control	7	Radish	0	10	0	0	TRUE
Fertilizer Control	7	Lettuce	0	10	0	0	TRUE
Fertilizer Control	7	Radish	0	10	0	0	TRUE
Fertilizer Control	7	Lettuce	0	10	0	0	TRUE
Compost without ABX	7	Radish	0	100	0	0	TRUE
Compost without ABX	7	Lettuce	0	100	0	0	TRUE
Compost without ABX	7	Radish	4	100	400	2.602059991	FALSE
Compost without ABX	7	Lettuce	0	100	0	0	TRUE
Compost without ABX	7	Radish	0	100	0	0	TRUE
Compost without ABX	7	Lettuce	0	100	0	0	TRUE
Compost with ABX	7	Radish	0	100	0	0	TRUE
Compost with ABX	7	Lettuce	0	100	0	0	TRUE
Compost with ABX	7	Radish	0	100	0	0	TRUE
Compost with ABX	7	Lettuce	0	100	0	0	TRUE
Compost with ABX	7	Radish	0	100	0	0	TRUE
Compost with ABX	7	Lettuce	0	100	0	0	TRUE
Manure with ABX	7	Radish	0	100	0	0	TRUE

Manure with ABX	7	Lettuce	0	100	0	0	TRUE
Manure with ABX	7	Radish	0	100	0	0	TRUE
Manure with ABX	7	Lettuce	0	100	0	0	TRUE
Manure with ABX	7	Radish	25	100	2500	3.397940009	FALSE
Manure with ABX	7	Lettuce	0	100	0	0	TRUE
No Amendment Control	7	None	0	10	0	0	TRUE
No Amendment Control	7	None	0	10	0	0	TRUE
No Amendment Control	7	None	0	10	0	0	TRUE
Fertilizer Control	7	Radish	0	10	0	0	TRUE
Fertilizer Control	7	Lettuce	0	10	0	0	TRUE
Fertilizer Control	7	Radish	0	10	0	0	TRUE
Fertilizer Control	7	Lettuce	0	10	0	0	TRUE
Fertilizer Control	7	Radish	0	10	0	0	TRUE
Fertilizer Control	7	Lettuce	0	10	0	0	TRUE
Compost without ABX	7	Radish	0	100	0	0	TRUE
Compost without ABX	7	Lettuce	0	100	0	0	TRUE
Compost without ABX	7	Radish	0	100	0	0	TRUE
Compost without ABX	7	Lettuce	0	100	0	0	TRUE
Compost without ABX	7	Radish	0	100	0	0	TRUE
Compost without ABX	7	Lettuce	0	100	0	0	TRUE
Compost with ABX	7	Radish	0	100	0	0	TRUE
Compost with ABX	7	Lettuce	0	100	0	0	TRUE
Compost with ABX	7	Radish	0	100	0	0	TRUE
Compost with ABX	7	Lettuce	0	100	0	0	TRUE
Compost with ABX	7	Radish	0	100	0	0	TRUE
Compost with ABX	7	Lettuce	0	100	0	0	TRUE
Manure with ABX	7	Radish	0	100	0	0	TRUE

Manure with ABX	7	Lettuce	0	100	0	0	TRUE
Manure with ABX	7	Radish	0	100	0	0	TRUE
Manure with ABX	7	Lettuce	0	100	0	0	TRUE
Manure with ABX	7	Radish	43	100	4300	3.633468456	FALSE
Manure with ABX	7	Lettuce	0	100	0	0	TRUE
No Amendment Control	28	None	0	10	0	0	TRUE
No Amendment Control	28	None	0	10	0	0	TRUE
No Amendment Control	28	None	0	10	0	0	TRUE
Fertilizer Control	28	Radish	0	10	0	0	TRUE
Fertilizer Control	28	Lettuce	0	10	0	0	TRUE
Fertilizer Control	28	Radish	0	10	0	0	TRUE
Fertilizer Control	28	Lettuce	0	10	0	0	TRUE
Fertilizer Control	28	Radish	0	10	0	0	TRUE
Fertilizer Control	28	Lettuce	0	10	0	0	TRUE
Compost without ABX	28	Radish	0	100	0	0	TRUE
Compost without ABX	28	Lettuce	0	100	0	0	TRUE
Compost without ABX	28	Radish	0	100	0	0	TRUE
Compost without ABX	28	Lettuce	0	100	0	0	TRUE
Compost without ABX	28	Radish	0	100	0	0	TRUE
Compost without ABX	28	Lettuce	0	100	0	0	TRUE
Compost with ABX	28	Radish	0	100	0	0	TRUE
Compost with ABX	28	Lettuce	0	100	0	0	TRUE
Compost with ABX	28	Radish	0	100	0	0	TRUE
Compost with ABX	28	Lettuce	0	100	0	0	TRUE
Compost with ABX	28	Radish	0	100	0	0	TRUE
Compost with ABX	28	Lettuce	2	100	200	2.301029996	FALSE
Manure with ABX	28	Radish	0	100	0	0	TRUE

Manure with ABX	28	Lettuce	2	100	200	2.301029996	FALSE
Manure with ABX	28	Radish	0	100	0	0	TRUE
Manure with ABX	28	Lettuce	0	100	0	0	TRUE
Manure with ABX	28	Radish	0	100	0	0	TRUE
Manure with ABX	28	Lettuce	1	100	100	2	FALSE
No Amendment Control	28	None	0	10	0	0	TRUE
No Amendment Control	28	None	0	10	0	0	TRUE
No Amendment Control	28	None	0	10	0	0	TRUE
Fertilizer Control	28	Radish	0	10	0	0	TRUE
Fertilizer Control	28	Lettuce	0	10	0	0	TRUE
Fertilizer Control	28	Radish	0	10	0	0	TRUE
Fertilizer Control	28	Lettuce	0	10	0	0	TRUE
Fertilizer Control	28	Radish	0	10	0	0	TRUE
Fertilizer Control	28	Lettuce	0	10	0	0	TRUE
Compost without ABX	28	Radish	0	100	0	0	TRUE
Compost without ABX	28	Lettuce	0	100	0	0	TRUE
Compost without ABX	28	Radish	0	100	0	0	TRUE
Compost without ABX	28	Lettuce	0	100	0	0	TRUE
Compost without ABX	28	Radish	0	100	0	0	TRUE
Compost without ABX	28	Lettuce	1	100	100	2	FALSE
Compost with ABX	28	Radish	0	100	0	0	TRUE
Compost with ABX	28	Lettuce	0	100	0	0	TRUE
Compost with ABX	28	Radish	0	100	0	0	TRUE
Compost with ABX	28	Lettuce	0	100	0	0	TRUE
Compost with ABX	28	Radish	0	100	0	0	TRUE
Compost with ABX	28	Lettuce	4	100	400	2.602059991	FALSE
Manure with ABX	28	Radish	0	100	0	0	TRUE

Manure with ABX	28	Lettuce	0	100	0	0	TRUE
Manure with ABX	28	Radish	0	100	0	0	TRUE
Manure with ABX	28	Lettuce	0	100	0	0	TRUE
Manure with ABX	28	Radish	0	100	0	0	TRUE
Manure with ABX	28	Lettuce	3	100	300	2.477121255	FALSE
No Amendment Control	28	None	0	10	0	0	TRUE
No Amendment Control	28	None	0	10	0	0	TRUE
No Amendment Control	28	None	0	10	0	0	TRUE
Fertilizer Control	28	Radish	0	10	0	0	TRUE
Fertilizer Control	28	Lettuce	0	10	0	0	TRUE
Fertilizer Control	28	Radish	0	10	0	0	TRUE
Fertilizer Control	28	Lettuce	0	10	0	0	TRUE
Fertilizer Control	28	Radish	0	10	0	0	TRUE
Fertilizer Control	28	Lettuce	0	10	0	0	TRUE
Compost without ABX	28	Radish	0	100	0	0	TRUE
Compost without ABX	28	Lettuce	0	100	0	0	TRUE
Compost without ABX	28	Radish	3	100	300	2.477121255	FALSE
Compost without ABX	28	Lettuce	0	100	0	0	TRUE
Compost without ABX	28	Radish	0	100	0	0	TRUE
Compost without ABX	28	Lettuce	0	100	0	0	TRUE
Compost with ABX	28	Radish	0	100	0	0	TRUE
Compost with ABX	28	Lettuce	0	100	0	0	TRUE
Compost with ABX	28	Radish	0	100	0	0	TRUE
Compost with ABX	28	Lettuce	0	100	0	0	TRUE
Compost with ABX	28	Radish	0	100	0	0	TRUE
Compost with ABX	28	Lettuce	2	100	200	2.301029996	FALSE
Manure with ABX	28	Radish	0	100	0	0	TRUE

Manure with ABX	28	Lettuce	18	100	1800	3.255272505	FALSE
Manure with ABX	28	Radish	0	100	0	0	TRUE
Manure with ABX	28	Lettuce	0	100	0	0	TRUE
Manure with ABX	28	Radish	0	100	0	0	TRUE
Manure with ABX	28	Lettuce	0	100	0	0	TRUE
No Amendment Control	42	None	0	10	0	0	TRUE
No Amendment Control	42	None	0	10	0	0	TRUE
No Amendment Control	42	None	0	10	0	0	TRUE
Fertilizer Control	42	Radish	0	10	0	0	TRUE
Fertilizer Control	42	Lettuce	0	10	0	0	TRUE
Fertilizer Control	42	Radish	0	10	0	0	TRUE
Fertilizer Control	42	Lettuce	0	10	0	0	TRUE
Fertilizer Control	42	Radish	0	10	0	0	TRUE
Fertilizer Control	42	Lettuce	0	10	0	0	TRUE
Compost without ABX	42	Radish	1	100	100	2	FALSE
Compost without ABX	42	Lettuce	0	10	0	0	TRUE
Compost without ABX	42	Radish	0	10	0	0	TRUE
Compost without ABX	42	Lettuce	0	10	0	0	TRUE
Compost without ABX	42	Radish	0	10	0	0	TRUE
Compost without ABX	42	Lettuce	0	10	0	0	TRUE
Compost with ABX	42	Radish	0	10	0	0	TRUE
Compost with ABX	42	Lettuce	0	10	0	0	TRUE
Compost with ABX	42	Radish	0	10	0	0	TRUE
Compost with ABX	42	Lettuce	0	10	0	0	TRUE
Compost with ABX	42	Radish	0	10	0	0	TRUE
Compost with ABX	42	Lettuce	0	10	0	0	TRUE
Manure with ABX	42	Radish	0	10	0	0	TRUE

Manure with ABX	42	Lettuce	0	10	0	0	TRUE
Manure with ABX	42	Radish	0	10	0	0	TRUE
Manure with ABX	42	Lettuce	0	10	0	0	TRUE
Manure with ABX	42	Radish	0	10	0	0	TRUE
Manure with ABX	42	Lettuce	0	10	0	0	TRUE
No Amendment Control	42	None	0	10	0	0	TRUE
No Amendment Control	42	None	0	10	0	0	TRUE
No Amendment Control	42	None	0	10	0	0	TRUE
Fertilizer Control	42	Radish	0	10	0	0	TRUE
Fertilizer Control	42	Lettuce	0	10	0	0	TRUE
Fertilizer Control	42	Radish	0	10	0	0	TRUE
Fertilizer Control	42	Lettuce	0	10	0	0	TRUE
Fertilizer Control	42	Radish	0	10	0	0	TRUE
Fertilizer Control	42	Lettuce	0	10	0	0	TRUE
Compost without ABX	42	Radish	5	100	500	2.698970004	FALSE
Compost without ABX	42	Lettuce	0	10	0	0	TRUE
Compost without ABX	42	Radish	0	10	0	0	TRUE
Compost without ABX	42	Lettuce	0	10	0	0	TRUE
Compost without ABX	42	Radish	0	10	0	0	TRUE
Compost without ABX	42	Lettuce	0	10	0	0	TRUE
Compost with ABX	42	Radish	0	10	0	0	TRUE
Compost with ABX	42	Lettuce	0	10	0	0	TRUE
Compost with ABX	42	Radish	0	10	0	0	TRUE
Compost with ABX	42	Lettuce	0	10	0	0	TRUE
Compost with ABX	42	Radish	0	10	0	0	TRUE
Compost with ABX	42	Lettuce	0	10	0	0	TRUE
Manure with ABX	42	Radish	0	10	0	0	TRUE

Manure with ABX	42	Lettuce	0	10	0	0	TRUE
Manure with ABX	42	Radish	0	10	0	0	TRUE
Manure with ABX	42	Lettuce	0	10	0	0	TRUE
Manure with ABX	42	Radish	0	10	0	0	TRUE
Manure with ABX	42	Lettuce	0	10	0	0	TRUE
No Amendment Control	42	None	0	10	0	0	TRUE
No Amendment Control	42	None	0	10	0	0	TRUE
No Amendment Control	42	None	0	10	0	0	TRUE
Fertilizer Control	42	Radish	38	100	3800	3.579783597	FALSE
Fertilizer Control	42	Lettuce	0	10	0	0	TRUE
Fertilizer Control	42	Radish	0	10	0	0	TRUE
Fertilizer Control	42	Lettuce	0	10	0	0	TRUE
Fertilizer Control	42	Radish	0	10	0	0	TRUE
Fertilizer Control	42	Lettuce	0	10	0	0	TRUE
Compost without ABX	42	Radish	0	10	0	0	TRUE
Compost without ABX	42	Lettuce	0	10	0	0	TRUE
Compost without ABX	42	Radish	0	10	0	0	TRUE
Compost without ABX	42	Lettuce	0	10	0	0	TRUE
Compost without ABX	42	Radish	0	10	0	0	TRUE
Compost without ABX	42	Lettuce	0	10	0	0	TRUE
Compost with ABX	42	Radish	0	10	0	0	TRUE
Compost with ABX	42	Lettuce	0	10	0	0	TRUE
Compost with ABX	42	Radish	0	10	0	0	TRUE
Compost with ABX	42	Lettuce	0	10	0	0	TRUE
Compost with ABX	42	Radish	0	10	0	0	TRUE
Compost with ABX	42	Lettuce	0	10	0	0	TRUE
Manure with ABX	42	Radish	0	10	0	0	TRUE

Manure with ABX	42	Lettuce	0	10	0	0	TRUE
Manure with ABX	42	Radish	0	10	0	0	TRUE
Manure with ABX	42	Lettuce	0	10	0	0	TRUE
Manure with ABX	42	Radish	0	10	0	0	TRUE
Manure with ABX	42	Lettuce	0	10	0	0	TRUE
No Amendment Control	56	None	0	10	0	0	TRUE
No Amendment Control	56	None	0	10	0	0	TRUE
No Amendment Control	56	None	0	10	0	0	TRUE
Fertilizer Control	56	Radish	0	10	0	0	TRUE
Fertilizer Control	56	Lettuce	0	10	0	0	TRUE
Fertilizer Control	56	Radish	0	10	0	0	TRUE
Fertilizer Control	56	Lettuce	0	10	0	0	TRUE
Fertilizer Control	56	Radish	0	10	0	0	TRUE
Fertilizer Control	56	Lettuce	0	10	0	0	TRUE
Compost without ABX	56	Radish	0	10	0	0	TRUE
Compost without ABX	56	Lettuce	0	10	0	0	TRUE
Compost without ABX	56	Radish	0	10	0	0	TRUE
Compost without ABX	56	Lettuce	0	10	0	0	TRUE
Compost without ABX	56	Radish	0	10	0	0	TRUE
Compost without ABX	56	Lettuce	0	10	0	0	TRUE
Compost with ABX	56	Radish	0	10	0	0	TRUE
Compost with ABX	56	Lettuce	0	10	0	0	TRUE
Compost with ABX	56	Radish	0	10	0	0	TRUE
Compost with ABX	56	Lettuce	0	10	0	0	TRUE
Compost with ABX	56	Radish	0	10	0	0	TRUE
Compost with ABX	56	Lettuce	0	10	0	0	TRUE
Manure with ABX	56	Radish	0	10	0	0	TRUE

Manure with ABX	56	Lettuce	0	10	0	0	TRUE
Manure with ABX	56	Radish	0	10	0	0	TRUE
Manure with ABX	56	Lettuce	0	10	0	0	TRUE
Manure with ABX	56	Radish	0	10	0	0	TRUE
Manure with ABX	56	Lettuce	0	10	0	0	TRUE
No Amendment Control	56	None	0	10	0	0	TRUE
No Amendment Control	56	None	0	10	0	0	TRUE
No Amendment Control	56	None	0	10	0	0	TRUE
Fertilizer Control	56	Radish	0	10	0	0	TRUE
Fertilizer Control	56	Lettuce	0	10	0	0	TRUE
Fertilizer Control	56	Radish	0	10	0	0	TRUE
Fertilizer Control	56	Lettuce	0	10	0	0	TRUE
Fertilizer Control	56	Radish	0	10	0	0	TRUE
Fertilizer Control	56	Lettuce	0	10	0	0	TRUE
Compost without ABX	56	Radish	0	10	0	0	TRUE
Compost without ABX	56	Lettuce	0	10	0	0	TRUE
Compost without ABX	56	Radish	0	10	0	0	TRUE
Compost without ABX	56	Lettuce	0	10	0	0	TRUE
Compost without ABX	56	Radish	0	10	0	0	TRUE
Compost without ABX	56	Lettuce	0	10	0	0	TRUE
Compost with ABX	56	Radish	0	10	0	0	TRUE
Compost with ABX	56	Lettuce	0	10	0	0	TRUE
Compost with ABX	56	Radish	0	10	0	0	TRUE
Compost with ABX	56	Lettuce	0	10	0	0	TRUE
Compost with ABX	56	Radish	0	10	0	0	TRUE
Compost with ABX	56	Lettuce	0	10	0	0	TRUE
Manure with ABX	56	Radish	0	10	0	0	TRUE

Manure with ABX	56	Lettuce	0	10	0	0	TRUE
Manure with ABX	56	Radish	0	10	0	0	TRUE
Manure with ABX	56	Lettuce	0	10	0	0	TRUE
Manure with ABX	56	Radish	0	10	0	0	TRUE
Manure with ABX	56	Lettuce	0	10	0	0	TRUE
No Amendment Control	56	None	0	10	0	0	TRUE
No Amendment Control	56	None	0	10	0	0	TRUE
No Amendment Control	56	None	0	10	0	0	TRUE
Fertilizer Control	56	Radish	0	10	0	0	TRUE
Fertilizer Control	56	Lettuce	0	10	0	0	TRUE
Fertilizer Control	56	Radish	0	10	0	0	TRUE
Fertilizer Control	56	Lettuce	0	10	0	0	TRUE
Fertilizer Control	56	Radish	0	10	0	0	TRUE
Fertilizer Control	56	Lettuce	0	10	0	0	TRUE
Compost without ABX	56	Radish	0	10	0	0	TRUE
Compost without ABX	56	Lettuce	0	10	0	0	TRUE
Compost without ABX	56	Radish	0	10	0	0	TRUE
Compost without ABX	56	Lettuce	0	10	0	0	TRUE
Compost without ABX	56	Radish	0	10	0	0	TRUE
Compost without ABX	56	Lettuce	0	10	0	0	TRUE
Compost with ABX	56	Radish	0	10	0	0	TRUE
Compost with ABX	56	Lettuce	0	10	0	0	TRUE
Compost with ABX	56	Radish	0	10	0	0	TRUE
Compost with ABX	56	Lettuce	0	10	0	0	TRUE
Compost with ABX	56	Radish	0	10	0	0	TRUE
Compost with ABX	56	Lettuce	0	10	0	0	TRUE
Manure with ABX	56	Radish	0	10	0	0	TRUE

Manure with ABX	56	Lettuce	0	10	0	0	TRUE
Manure with ABX	56	Radish	0	10	0	0	TRUE
Manure with ABX	56	Lettuce	0	10	0	0	TRUE
Manure with ABX	56	Radish	0	10	0	0	TRUE
Manure with ABX	56	Lettuce	0	10	0	0	TRUE
No Amendment Control	90	None	0	10	0	0	TRUE
No Amendment Control	90	None	0	10	0	0	TRUE
No Amendment Control	90	None	0	10	0	0	TRUE
Fertilizer Control	90	Radish	0	10	0	0	TRUE
Fertilizer Control	90	Lettuce	0	10	0	0	TRUE
Fertilizer Control	90	Radish	0	10	0	0	TRUE
Fertilizer Control	90	Lettuce	0	10	0	0	TRUE
Fertilizer Control	90	Radish	0	10	0	0	TRUE
Fertilizer Control	90	Lettuce	0	10	0	0	TRUE
Compost without ABX	90	Radish	0	10	0	0	TRUE
Compost without ABX	90	Lettuce	0	10	0	0	TRUE
Compost without ABX	90	Radish	0	10	0	0	TRUE
Compost without ABX	90	Lettuce	0	10	0	0	TRUE
Compost without ABX	90	Radish	0	10	0	0	TRUE
Compost without ABX	90	Lettuce	0	10	0	0	TRUE
Compost with ABX	90	Radish	0	10	0	0	TRUE
Compost with ABX	90	Lettuce	0	10	0	0	TRUE
Compost with ABX	90	Radish	0	10	0	0	TRUE
Compost with ABX	90	Lettuce	0	10	0	0	TRUE
Compost with ABX	90	Radish	0	10	0	0	TRUE
Compost with ABX	90	Lettuce	0	10	0	0	TRUE
Manure with ABX	90	Radish	0	10	0	0	TRUE

Manure with ABX	90	Lettuce	0	10	0	0	TRUE
Manure with ABX	90	Radish	0	10	0	0	TRUE
Manure with ABX	90	Lettuce	0	10	0	0	TRUE
Manure with ABX	90	Radish	0	10	0	0	TRUE
Manure with ABX	90	Lettuce	0	10	0	0	TRUE
No Amendment Control	90	None	0	10	0	0	TRUE
No Amendment Control	90	None	0	10	0	0	TRUE
No Amendment Control	90	None	0	10	0	0	TRUE
Fertilizer Control	90	Radish	0	10	0	0	TRUE
Fertilizer Control	90	Lettuce	0	10	0	0	TRUE
Fertilizer Control	90	Radish	0	10	0	0	TRUE
Fertilizer Control	90	Lettuce	0	10	0	0	TRUE
Fertilizer Control	90	Radish	0	10	0	0	TRUE
Fertilizer Control	90	Lettuce	0	10	0	0	TRUE
Compost without ABX	90	Radish	0	10	0	0	TRUE
Compost without ABX	90	Lettuce	0	10	0	0	TRUE
Compost without ABX	90	Radish	0	10	0	0	TRUE
Compost without ABX	90	Lettuce	0	10	0	0	TRUE
Compost without ABX	90	Radish	0	10	0	0	TRUE
Compost without ABX	90	Lettuce	0	10	0	0	TRUE
Compost with ABX	90	Radish	0	10	0	0	TRUE
Compost with ABX	90	Lettuce	0	10	0	0	TRUE
Compost with ABX	90	Radish	0	10	0	0	TRUE
Compost with ABX	90	Lettuce	0	10	0	0	TRUE
Compost with ABX	90	Radish	0	10	0	0	TRUE
Compost with ABX	90	Lettuce	0	10	0	0	TRUE
Manure with ABX	90	Radish	0	10	0	0	TRUE

Manure with ABX	90	Lettuce	0	10	0	0	TRUE
Manure with ABX	90	Radish	0	10	0	0	TRUE
Manure with ABX	90	Lettuce	0	10	0	0	TRUE
Manure with ABX	90	Radish	0	10	0	0	TRUE
Manure with ABX	90	Lettuce	0	10	0	0	TRUE
No Amendment Control	90	None	0	10	0	0	TRUE
No Amendment Control	90	None	0	10	0	0	TRUE
No Amendment Control	90	None	0	10	0	0	TRUE
Fertilizer Control	90	Radish	0	10	0	0	TRUE
Fertilizer Control	90	Lettuce	0	10	0	0	TRUE
Fertilizer Control	90	Radish	0	10	0	0	TRUE
Fertilizer Control	90	Lettuce	0	10	0	0	TRUE
Fertilizer Control	90	Radish	0	10	0	0	TRUE
Fertilizer Control	90	Lettuce	0	10	0	0	TRUE
Compost without ABX	90	Radish	0	10	0	0	TRUE
Compost without ABX	90	Lettuce	0	10	0	0	TRUE
Compost without ABX	90	Radish	0	10	0	0	TRUE
Compost without ABX	90	Lettuce	0	10	0	0	TRUE
Compost without ABX	90	Radish	0	10	0	0	TRUE
Compost without ABX	90	Lettuce	0	10	0	0	TRUE
Compost with ABX	90	Radish	0	10	0	0	TRUE
Compost with ABX	90	Lettuce	0	10	0	0	TRUE
Compost with ABX	90	Radish	0	10	0	0	TRUE
Compost with ABX	90	Lettuce	0	10	0	0	TRUE
Compost with ABX	90	Radish	0	10	0	0	TRUE
Compost with ABX	90	Lettuce	0	10	0	0	TRUE
Manure with ABX	90	Radish	0	10	0	0	TRUE

Manure with ABX	90	Lettuce	0	10	0	0	TRUE
Manure with ABX	90	Radish	0	10	0	0	TRUE
Manure with ABX	90	Lettuce	0	10	0	0	TRUE
Manure with ABX	90	Radish	0	10	0	0	TRUE
Manure with ABX	90	Lettuce	0	10	0	0	TRUE
No Amendment Control	120	None	0	10	0	0	TRUE
No Amendment Control	120	None	0	10	0	0	TRUE
No Amendment Control	120	None	94	100	9400	3.973127854	FALSE
Fertilizer Control	120	Radish	96	100	9600	3.982271233	FALSE
Fertilizer Control	120	Lettuce	0	10	0	0	TRUE
Fertilizer Control	120	Radish	0	10	0	0	TRUE
Fertilizer Control	120	Lettuce	0	10	0	0	TRUE
Fertilizer Control	120	Radish	0	10	0	0	TRUE
Fertilizer Control	120	Lettuce	0	10	0	0	TRUE
Compost without ABX	120	Radish	0	10	0	0	TRUE
Compost without ABX	120	Lettuce	0	10	0	0	TRUE
Compost without ABX	120	Radish	0	10	0	0	TRUE
Compost without ABX	120	Lettuce	0	10	0	0	TRUE
Compost without ABX	120	Radish	0	10	0	0	TRUE
Compost without ABX	120	Lettuce	0	10	0	0	TRUE
Compost with ABX	120	Radish	0	10	0	0	TRUE
Compost with ABX	120	Lettuce	0	10	0	0	TRUE
Compost with ABX	120	Radish	0	10	0	0	TRUE
Compost with ABX	120	Lettuce	0	10	0	0	TRUE
Compost with ABX	120	Radish	0	10	0	0	TRUE
Compost with ABX	120	Lettuce	0	10	0	0	TRUE
Manure with ABX	120	Radish	0	10	0	0	TRUE

Manure with ABX	120	Lettuce	0	10	0	0	TRUE
Manure with ABX	120	Radish	0	10	0	0	TRUE
Manure with ABX	120	Lettuce	180	100	18000	4.255272505	FALSE
Manure with ABX	120	Radish	0	10	0	0	TRUE
Manure with ABX	120	Lettuce	0	10	0	0	TRUE
No Amendment Control	120	None	0	10	0	0	TRUE
No Amendment Control	120	None	0	10	0	0	TRUE
No Amendment Control	120	None	120	100	12000	4.079181246	FALSE
Fertilizer Control	120	Radish	145	100	14500	4.161368002	FALSE
Fertilizer Control	120	Lettuce	0	10	0	0	TRUE
Fertilizer Control	120	Radish	0	10	0	0	TRUE
Fertilizer Control	120	Lettuce	0	10	0	0	TRUE
Fertilizer Control	120	Radish	0	10	0	0	TRUE
Fertilizer Control	120	Lettuce	0	10	0	0	TRUE
Compost without ABX	120	Radish	0	10	0	0	TRUE
Compost without ABX	120	Lettuce	0	10	0	0	TRUE
Compost without ABX	120	Radish	1	100	100	2	FALSE
Compost without ABX	120	Lettuce	0	10	0	0	TRUE
Compost without ABX	120	Radish	0	10	0	0	TRUE
Compost without ABX	120	Lettuce	0	10	0	0	TRUE
Compost with ABX	120	Radish	0	10	0	0	TRUE
Compost with ABX	120	Lettuce	0	10	0	0	TRUE
Compost with ABX	120	Radish	0	10	0	0	TRUE
Compost with ABX	120	Lettuce	0	10	0	0	TRUE
Compost with ABX	120	Radish	0	10	0	0	TRUE
Compost with ABX	120	Lettuce	0	10	0	0	TRUE
Manure with ABX	120	Radish	0	10	0	0	TRUE

Manure with ABX	120	Lettuce	0	10	0	0	TRUE
Manure with ABX	120	Radish	0	10	0	0	TRUE
Manure with ABX	120	Lettuce	104	100	10400	4.017033339	FALSE
Manure with ABX	120	Radish	0	10	0	0	TRUE
Manure with ABX	120	Lettuce	0	10	0	0	TRUE
No Amendment Control	120	None	0	10	0	0	TRUE
No Amendment Control	120	None	0	10	0	0	TRUE
No Amendment Control	120	None	78	100	7800	3.892094603	FALSE
Fertilizer Control	120	Radish	84	100	8400	3.924279286	FALSE
Fertilizer Control	120	Lettuce	0	10	0	0	TRUE
Fertilizer Control	120	Radish	0	10	0	0	TRUE
Fertilizer Control	120	Lettuce	0	10	0	0	TRUE
Fertilizer Control	120	Radish	0	10	0	0	TRUE
Fertilizer Control	120	Lettuce	0	10	0	0	TRUE
Compost without ABX	120	Radish	0	10	0	0	TRUE
Compost without ABX	120	Lettuce	0	10	0	0	TRUE
Compost without ABX	120	Radish	0	10	0	0	TRUE
Compost without ABX	120	Lettuce	0	10	0	0	TRUE
Compost without ABX	120	Radish	0	10	0	0	TRUE
Compost without ABX	120	Lettuce	0	10	0	0	TRUE
Compost with ABX	120	Radish	0	10	0	0	TRUE
Compost with ABX	120	Lettuce	0	10	0	0	TRUE
Compost with ABX	120	Radish	0	10	0	0	TRUE
Compost with ABX	120	Lettuce	0	10	0	0	TRUE
Compost with ABX	120	Radish	0	10	0	0	TRUE
Compost with ABX	120	Lettuce	0	10	0	0	TRUE
Manure with ABX	120	Radish	0	10	0	0	TRUE

Manure with ABX	120	Lettuce	0	10	0	0	TRUE
Manure with ABX	120	Radish	0	10	0	0	TRUE
Manure with ABX	120	Lettuce	108	100	10800	4.033423755	FALSE
Manure with ABX	120	Radish	0	10	0	0	TRUE
Manure with ABX	120	Lettuce	0	10	0	0	TRUE

APPENDIX L. Raw Data: Colony Counts from Erythromycin MacConkey Agar Plates for entire study.

Table L.1. Table I.1. Colony counts, dilution, and CFU's for Day -1, 0, 7, 28, 42, 56, 90, and 120 erythromycin plates.

Treatment	Time	Vegetable	Colonies Counted	Dilution Factor	CFU E. coli/ g soil	log10 CFU E. coli/ g soil	Censored CFU
No Amendment Control	-1	None	0	10	0	0	TRUE
No Amendment Control	-1	None	0	10	0	0	TRUE
No Amendment Control	-1	None	0	10	0	0	TRUE
Fertilizer Control	-1	Radish	0	10	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	10	0	0	TRUE
Fertilizer Control	-1	Radish	0	10	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	10	0	0	TRUE
Fertilizer Control	-1	Radish	0	10	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	10	0	0	TRUE
Compost without ABX	-1	Radish	0	10	0	0	TRUE
Compost without ABX	-1	Lettuce	0	10	0	0	TRUE
Compost without ABX	-1	Radish	0	10	0	0	TRUE
Compost without ABX	-1	Lettuce	0	10	0	0	TRUE
Compost without ABX	-1	Radish	0	10	0	0	TRUE
Compost without ABX	-1	Lettuce	0	10	0	0	TRUE
Compost with ABX	-1	Radish	0	10	0	0	TRUE
Compost with ABX	-1	Lettuce	0	10	0	0	TRUE
Compost with ABX	-1	Radish	0	10	0	0	TRUE
Compost with ABX	-1	Lettuce	0	10	0	0	TRUE
Compost with ABX	-1	Radish	0	10	0	0	TRUE
Compost with ABX	-1	Lettuce	0	10	0	0	TRUE
Manure with ABX	-1	Radish	0	10	0	0	TRUE

Manure with ABX	-1	Lettuce	0	10	0	0	TRUE
Manure with ABX	-1	Radish	0	10	0	0	TRUE
Manure with ABX	-1	Lettuce	0	10	0	0	TRUE
Manure with ABX	-1	Radish	0	10	0	0	TRUE
Manure with ABX	-1	Lettuce	1	10	10	1	FALSE
No Amendment Control	-1	None	0	10	0	0	TRUE
No Amendment Control	-1	None	0	10	0	0	TRUE
No Amendment Control	-1	None	0	10	0	0	TRUE
Fertilizer Control	-1	Radish	0	10	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	10	0	0	TRUE
Fertilizer Control	-1	Radish	0	10	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	10	0	0	TRUE
Fertilizer Control	-1	Radish	0	10	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	10	0	0	TRUE
Compost without ABX	-1	Radish	0	10	0	0	TRUE
Compost without ABX	-1	Lettuce	0	10	0	0	TRUE
Compost without ABX	-1	Radish	0	10	0	0	TRUE
Compost without ABX	-1	Lettuce	0	10	0	0	TRUE
Compost without ABX	-1	Radish	0	10	0	0	TRUE
Compost without ABX	-1	Lettuce	0	10	0	0	TRUE
Compost with ABX	-1	Radish	0	10	0	0	TRUE
Compost with ABX	-1	Lettuce	0	10	0	0	TRUE
Compost with ABX	-1	Radish	0	10	0	0	TRUE
Compost with ABX	-1	Lettuce	0	10	0	0	TRUE
Compost with ABX	-1	Radish	0	10	0	0	TRUE
Compost with ABX	-1	Lettuce	0	10	0	0	TRUE
Manure with ABX	-1	Radish	0	10	0	0	TRUE

Manure with ABX	-1	Lettuce	0	10	0	0	TRUE
Manure with ABX	-1	Radish	0	10	0	0	TRUE
Manure with ABX	-1	Lettuce	0	10	0	0	TRUE
Manure with ABX	-1	Radish	3	10	30	1.477121255	FALSE
Manure with ABX	-1	Lettuce	0	10	0	0	TRUE
No Amendment Control	-1	None	0	10	0	0	TRUE
No Amendment Control	-1	None	0	10	0	0	TRUE
No Amendment Control	-1	None	0	10	0	0	TRUE
Fertilizer Control	-1	Radish	0	10	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	10	0	0	TRUE
Fertilizer Control	-1	Radish	0	10	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	10	0	0	TRUE
Fertilizer Control	-1	Radish	0	10	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	10	0	0	TRUE
Compost without ABX	-1	Radish	0	10	0	0	TRUE
Compost without ABX	-1	Lettuce	0	10	0	0	TRUE
Compost without ABX	-1	Radish	0	10	0	0	TRUE
Compost without ABX	-1	Lettuce	0	10	0	0	TRUE
Compost without ABX	-1	Radish	0	10	0	0	TRUE
Compost without ABX	-1	Lettuce	0	10	0	0	TRUE
Compost with ABX	-1	Radish	0	10	0	0	TRUE
Compost with ABX	-1	Lettuce	0	10	0	0	TRUE
Compost with ABX	-1	Radish	0	10	0	0	TRUE
Compost with ABX	-1	Lettuce	0	10	0	0	TRUE
Compost with ABX	-1	Radish	0	10	0	0	TRUE
Compost with ABX	-1	Lettuce	0	10	0	0	TRUE
Manure with ABX	-1	Radish	0	10	0	0	TRUE

Manure with ABX	-1	Lettuce	0	10	0	0	TRUE
Manure with ABX	-1	Radish	0	10	0	0	TRUE
Manure with ABX	-1	Lettuce	0	10	0	0	TRUE
Manure with ABX	-1	Radish	4	10	40	1.602059991	FALSE
Manure with ABX	-1	Lettuce	0	10	0	0	TRUE
No Amendment Control	0	None	0	100	0	0	TRUE
No Amendment Control	0	None	0	100	0	0	TRUE
No Amendment Control	0	None	0	100	0	0	TRUE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	0	100	0	0	TRUE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	0	100	0	0	TRUE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	0	100	0	0	TRUE
Compost without ABX	0	Radish	0	100	0	0	TRUE
Compost without ABX	0	Lettuce	4	100	400	2.602059991	FALSE
Compost without ABX	0	Radish	7	100	700	2.84509804	FALSE
Compost without ABX	0	Lettuce	10	100	1000	3	FALSE
Compost without ABX	0	Radish	4	100	400	2.602059991	FALSE
Compost without ABX	0	Lettuce	4	100	400	2.602059991	FALSE
Compost with ABX	0	Radish	0	100	0	0	TRUE
Compost with ABX	0	Lettuce	2	100	200	2.301029996	FALSE
Compost with ABX	0	Radish	1	100	100	2	FALSE
Compost with ABX	0	Lettuce	0	100	0	0	TRUE
Compost with ABX	0	Radish	3	100	300	2.477121255	FALSE
Compost with ABX	0	Lettuce	62	100	6200	3.792391689	FALSE
Manure with ABX	0	Radish	10	100	1000	3	FALSE

Manure with ABX	0	Lettuce	30	100	3000	3.477121255	FALSE
Manure with ABX	0	Radish	8	100	800	2.903089987	FALSE
Manure with ABX	0	Lettuce	7	100	700	2.84509804	FALSE
Manure with ABX	0	Radish	0	100	0	0	TRUE
Manure with ABX	0	Lettuce	22	100	2200	3.342422681	FALSE
No Amendment Control	0	None	0	100	0	0	TRUE
No Amendment Control	0	None	0	100	0	0	TRUE
No Amendment Control	0	None	0	100	0	0	TRUE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	0	100	0	0	TRUE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	0	100	0	0	TRUE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	0	100	0	0	TRUE
Compost without ABX	0	Radish	0	100	0	0	TRUE
Compost without ABX	0	Lettuce	0	100	0	0	TRUE
Compost without ABX	0	Radish	3	100	300	2.477121255	FALSE
Compost without ABX	0	Lettuce	2	100	200	2.301029996	FALSE
Compost without ABX	0	Radish	2	100	200	2.301029996	FALSE
Compost without ABX	0	Lettuce	2	100	200	2.301029996	FALSE
Compost with ABX	0	Radish	0	100	0	0	TRUE
Compost with ABX	0	Lettuce	7	100	700	2.84509804	FALSE
Compost with ABX	0	Radish	0	100	0	0	TRUE
Compost with ABX	0	Lettuce	1	100	100	2	FALSE
Compost with ABX	0	Radish	1	100	100	2	FALSE
Compost with ABX	0	Lettuce	65	100	6500	3.812913357	FALSE
Manure with ABX	0	Radish	4	100	400	2.602059991	FALSE

Manure with ABX	0	Lettuce	17	100	1700	3.230448921	FALSE
Manure with ABX	0	Radish	8	100	800	2.903089987	FALSE
Manure with ABX	0	Lettuce	4	100	400	2.602059991	FALSE
Manure with ABX	0	Radish	0	100	0	0	TRUE
Manure with ABX	0	Lettuce	6	100	600	2.77815125	FALSE
No Amendment Control	0	None	0	100	0	0	TRUE
No Amendment Control	0	None	0	100	0	0	TRUE
No Amendment Control	0	None	0	100	0	0	TRUE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	0	100	0	0	TRUE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	0	100	0	0	TRUE
Fertilizer Control	0	Radish	0	100	0	0	TRUE
Fertilizer Control	0	Lettuce	0	100	0	0	TRUE
Compost without ABX	0	Radish	0	100	0	0	TRUE
Compost without ABX	0	Lettuce	4	100	400	2.602059991	FALSE
Compost without ABX	0	Radish	7	100	700	2.84509804	FALSE
Compost without ABX	0	Lettuce	2	100	200	2.301029996	FALSE
Compost without ABX	0	Radish	2	100	200	2.301029996	FALSE
Compost without ABX	0	Lettuce	4	100	400	2.602059991	FALSE
Compost with ABX	0	Radish	0	100	0	0	TRUE
Compost with ABX	0	Lettuce	0	100	0	0	TRUE
Compost with ABX	0	Radish	1	100	100	2	FALSE
Compost with ABX	0	Lettuce	0	100	0	0	TRUE
Compost with ABX	0	Radish	5	100	500	2.698970004	FALSE
Compost with ABX	0	Lettuce	83	100	8300	3.919078092	FALSE
Manure with ABX	0	Radish	6	100	600	2.77815125	FALSE

Manure with ABX	0	Lettuce	25	100	2500	3.397940009	FALSE
Manure with ABX	0	Radish	4	100	400	2.602059991	FALSE
Manure with ABX	0	Lettuce	9	100	900	2.954242509	FALSE
Manure with ABX	0	Radish	0	100	0	0	TRUE
Manure with ABX	0	Lettuce	6	100	600	2.77815125	FALSE
No Amendment Control	7	None	0	10	0	0	TRUE
No Amendment Control	7	None	0	10	0	0	TRUE
No Amendment Control	7	None	0	10	0	0	TRUE
Fertilizer Control	7	Radish	0	10	0	0	TRUE
Fertilizer Control	7	Lettuce	0	10	0	0	TRUE
Fertilizer Control	7	Radish	0	10	0	0	TRUE
Fertilizer Control	7	Lettuce	0	10	0	0	TRUE
Fertilizer Control	7	Radish	0	10	0	0	TRUE
Fertilizer Control	7	Lettuce	0	10	0	0	TRUE
Compost without ABX	7	Radish	0	100	0	0	TRUE
Compost without ABX	7	Lettuce	0	100	0	0	TRUE
Compost without ABX	7	Radish	0	100	0	0	TRUE
Compost without ABX	7	Lettuce	0	100	0	0	TRUE
Compost without ABX	7	Radish	0	100	0	0	TRUE
Compost without ABX	7	Lettuce	0	100	0	0	TRUE
Compost with ABX	7	Radish	0	100	0	0	TRUE
Compost with ABX	7	Lettuce	0	100	0	0	TRUE
Compost with ABX	7	Radish	0	100	0	0	TRUE
Compost with ABX	7	Lettuce	0	100	0	0	TRUE
Compost with ABX	7	Radish	0	100	0	0	TRUE
Compost with ABX	7	Lettuce	0	100	0	0	TRUE
Manure with ABX	7	Radish	0	100	0	0	TRUE

Manure with ABX	7	Lettuce	0	100	0	0	TRUE
Manure with ABX	7	Radish	0	100	0	0	TRUE
Manure with ABX	7	Lettuce	0	100	0	0	TRUE
Manure with ABX	7	Radish	15	100	1500	3.176091259	FALSE
Manure with ABX	7	Lettuce	0	100	0	0	TRUE
No Amendment Control	7	None	0	10	0	0	TRUE
No Amendment Control	7	None	0	10	0	0	TRUE
No Amendment Control	7	None	0	10	0	0	TRUE
Fertilizer Control	7	Radish	0	10	0	0	TRUE
Fertilizer Control	7	Lettuce	0	10	0	0	TRUE
Fertilizer Control	7	Radish	0	10	0	0	TRUE
Fertilizer Control	7	Lettuce	0	10	0	0	TRUE
Fertilizer Control	7	Radish	0	10	0	0	TRUE
Fertilizer Control	7	Lettuce	0	10	0	0	TRUE
Compost without ABX	7	Radish	0	100	0	0	TRUE
Compost without ABX	7	Lettuce	0	100	0	0	TRUE
Compost without ABX	7	Radish	0	100	0	0	TRUE
Compost without ABX	7	Lettuce	0	100	0	0	TRUE
Compost without ABX	7	Radish	0	100	0	0	TRUE
Compost without ABX	7	Lettuce	0	100	0	0	TRUE
Compost with ABX	7	Radish	1	100	100	2	FALSE
Compost with ABX	7	Lettuce	0	100	0	0	TRUE
Compost with ABX	7	Radish	0	100	0	0	TRUE
Compost with ABX	7	Lettuce	0	100	0	0	TRUE
Compost with ABX	7	Radish	0	100	0	0	TRUE
Compost with ABX	7	Lettuce	1	100	100	2	FALSE
Manure with ABX	7	Radish	0	100	0	0	TRUE

Manure with ABX	7	Lettuce	0	100	0	0	TRUE
Manure with ABX	7	Radish	0	100	0	0	TRUE
Manure with ABX	7	Lettuce	0	100	0	0	TRUE
Manure with ABX	7	Radish	11	100	1100	3.041392685	FALSE
Manure with ABX	7	Lettuce	0	100	0	0	TRUE
No Amendment Control	7	None	0	10	0	0	TRUE
No Amendment Control	7	None	0	10	0	0	TRUE
No Amendment Control	7	None	0	10	0	0	TRUE
Fertilizer Control	7	Radish	0	10	0	0	TRUE
Fertilizer Control	7	Lettuce	0	10	0	0	TRUE
Fertilizer Control	7	Radish	0	10	0	0	TRUE
Fertilizer Control	7	Lettuce	0	10	0	0	TRUE
Fertilizer Control	7	Radish	0	10	0	0	TRUE
Fertilizer Control	7	Lettuce	0	10	0	0	TRUE
Compost without ABX	7	Radish	0	100	0	0	TRUE
Compost without ABX	7	Lettuce	0	100	0	0	TRUE
Compost without ABX	7	Radish	0	100	0	0	TRUE
Compost without ABX	7	Lettuce	0	100	0	0	TRUE
Compost without ABX	7	Radish	0	100	0	0	TRUE
Compost without ABX	7	Lettuce	0	100	0	0	TRUE
Compost with ABX	7	Radish	0	100	0	0	TRUE
Compost with ABX	7	Lettuce	0	100	0	0	TRUE
Compost with ABX	7	Radish	1	100	100	2	FALSE
Compost with ABX	7	Lettuce	0	100	0	0	TRUE
Compost with ABX	7	Radish	0	100	0	0	TRUE
Compost with ABX	7	Lettuce	0	100	0	0	TRUE
Manure with ABX	7	Radish	0	100	0	0	TRUE

Manure with ABX	7	Lettuce	0	100	0	0	TRUE
Manure with ABX	7	Radish	0	100	0	0	TRUE
Manure with ABX	7	Lettuce	0	100	0	0	TRUE
Manure with ABX	7	Radish	0	100	0	0	TRUE
Manure with ABX	7	Lettuce	0	100	0	0	TRUE
No Amendment Control	28	None	1	10	10	1	FALSE
No Amendment Control	28	None	0	10	0	0	TRUE
No Amendment Control	28	None	0	10	0	0	TRUE
Fertilizer Control	28	Radish	0	10	0	0	TRUE
Fertilizer Control	28	Lettuce	27	10	270	2.431363764	FALSE
Fertilizer Control	28	Radish	0	10	0	0	TRUE
Fertilizer Control	28	Lettuce	0	10	0	0	TRUE
Fertilizer Control	28	Radish	0	10	0	0	TRUE
Fertilizer Control	28	Lettuce	0	10	0	0	TRUE
Compost without ABX	28	Radish	0	100	0	0	TRUE
Compost without ABX	28	Lettuce	0	100	0	0	TRUE
Compost without ABX	28	Radish	0	100	0	0	TRUE
Compost without ABX	28	Lettuce	0	100	0	0	TRUE
Compost without ABX	28	Radish	0	100	0	0	TRUE
Compost without ABX	28	Lettuce	0	100	0	0	TRUE
Compost with ABX	28	Radish	0	100	0	0	TRUE
Compost with ABX	28	Lettuce	0	100	0	0	TRUE
Compost with ABX	28	Radish	0	100	0	0	TRUE
Compost with ABX	28	Lettuce	0	100	0	0	TRUE
Compost with ABX	28	Radish	0	100	0	0	TRUE
Compost with ABX	28	Lettuce	0	100	0	0	TRUE
Manure with ABX	28	Radish	0	100	0	0	TRUE

Manure with ABX	28	Lettuce	0	100	0	0	TRUE
Manure with ABX	28	Radish	0	100	0	0	TRUE
Manure with ABX	28	Lettuce	0	100	0	0	TRUE
Manure with ABX	28	Radish	0	100	0	0	TRUE
Manure with ABX	28	Lettuce	1	100	100	2	FALSE
No Amendment Control	28	None	0	10	0	0	TRUE
No Amendment Control	28	None	0	10	0	0	TRUE
No Amendment Control	28	None	0	10	0	0	TRUE
Fertilizer Control	28	Radish	0	10	0	0	TRUE
Fertilizer Control	28	Lettuce	23	10	230	2.361727836	FALSE
Fertilizer Control	28	Radish	0	10	0	0	TRUE
Fertilizer Control	28	Lettuce	0	10	0	0	TRUE
Fertilizer Control	28	Radish	0	10	0	0	TRUE
Fertilizer Control	28	Lettuce	0	10	0	0	TRUE
Compost without ABX	28	Radish	0	100	0	0	TRUE
Compost without ABX	28	Lettuce	1	100	100	2	FALSE
Compost without ABX	28	Radish	0	100	0	0	TRUE
Compost without ABX	28	Lettuce	0	100	0	0	TRUE
Compost without ABX	28	Radish	0	100	0	0	TRUE
Compost without ABX	28	Lettuce	0	100	0	0	TRUE
Compost with ABX	28	Radish	0	100	0	0	TRUE
Compost with ABX	28	Lettuce	0	100	0	0	TRUE
Compost with ABX	28	Radish	0	100	0	0	TRUE
Compost with ABX	28	Lettuce	0	100	0	0	TRUE
Compost with ABX	28	Radish	0	100	0	0	TRUE
Compost with ABX	28	Lettuce	0	100	0	0	TRUE
Manure with ABX	28	Radish	0	100	0	0	TRUE

Manure with ABX	28	Lettuce	0	100	0	0	TRUE
Manure with ABX	28	Radish	0	100	0	0	TRUE
Manure with ABX	28	Lettuce	0	100	0	0	TRUE
Manure with ABX	28	Radish	0	100	0	0	TRUE
Manure with ABX	28	Lettuce	0	100	0	0	TRUE
No Amendment Control	28	None	0	10	0	0	TRUE
No Amendment Control	28	None	0	10	0	0	TRUE
No Amendment Control	28	None	0	10	0	0	TRUE
Fertilizer Control	28	Radish	0	10	0	0	TRUE
Fertilizer Control	28	Lettuce	14	10	140	2.146128036	FALSE
Fertilizer Control	28	Radish	0	10	0	0	TRUE
Fertilizer Control	28	Lettuce	0	10	0	0	TRUE
Fertilizer Control	28	Radish	0	10	0	0	TRUE
Fertilizer Control	28	Lettuce	0	10	0	0	TRUE
Compost without ABX	28	Radish	0	100	0	0	TRUE
Compost without ABX	28	Lettuce	0	100	0	0	TRUE
Compost without ABX	28	Radish	1	100	100	2	FALSE
Compost without ABX	28	Lettuce	0	100	0	0	TRUE
Compost without ABX	28	Radish	0	100	0	0	TRUE
Compost without ABX	28	Lettuce	0	100	0	0	TRUE
Compost with ABX	28	Radish	0	100	0	0	TRUE
Compost with ABX	28	Lettuce	0	100	0	0	TRUE
Compost with ABX	28	Radish	0	100	0	0	TRUE
Compost with ABX	28	Lettuce	0	100	0	0	TRUE
Compost with ABX	28	Radish	0	100	0	0	TRUE
Compost with ABX	28	Lettuce	0	100	0	0	TRUE
Manure with ABX	28	Radish	0	100	0	0	TRUE

Manure with ABX	28	Lettuce	0	100	0	0	TRUE
Manure with ABX	28	Radish	0	100	0	0	TRUE
Manure with ABX	28	Lettuce	0	100	0	0	TRUE
Manure with ABX	28	Radish	0	100	0	0	TRUE
Manure with ABX	28	Lettuce	1	100	100	2	FALSE
No Amendment Control	42	None	0	10	0	0	TRUE
No Amendment Control	42	None	0	10	0	0	TRUE
No Amendment Control	42	None	0	10	0	0	TRUE
Fertilizer Control	42	Radish	0	10	0	0	TRUE
Fertilizer Control	42	Lettuce	0	10	0	0	TRUE
Fertilizer Control	42	Radish	0	10	0	0	TRUE
Fertilizer Control	42	Lettuce	0	10	0	0	TRUE
Fertilizer Control	42	Radish	0	10	0	0	TRUE
Fertilizer Control	42	Lettuce	0	10	0	0	TRUE
Compost without ABX	42	Radish	0	10	0	0	TRUE
Compost without ABX	42	Lettuce	0	10	0	0	TRUE
Compost without ABX	42	Radish	0	10	0	0	TRUE
Compost without ABX	42	Lettuce	0	10	0	0	TRUE
Compost without ABX	42	Radish	0	10	0	0	TRUE
Compost without ABX	42	Lettuce	0	10	0	0	TRUE
Compost with ABX	42	Radish	0	10	0	0	TRUE
Compost with ABX	42	Lettuce	0	10	0	0	TRUE
Compost with ABX	42	Radish	0	10	0	0	TRUE
Compost with ABX	42	Lettuce	0	10	0	0	TRUE
Compost with ABX	42	Radish	0	10	0	0	TRUE
Compost with ABX	42	Lettuce	0	10	0	0	TRUE
Manure with ABX	42	Radish	0	10	0	0	TRUE

Manure with ABX	42	Lettuce	0	10	0	0	TRUE
Manure with ABX	42	Radish	0	10	0	0	TRUE
Manure with ABX	42	Lettuce	0	10	0	0	TRUE
Manure with ABX	42	Radish	0	10	0	0	TRUE
Manure with ABX	42	Lettuce	1	10	10	1	FALSE
No Amendment Control	42	None	0	10	0	0	TRUE
No Amendment Control	42	None	0	10	0	0	TRUE
No Amendment Control	42	None	0	10	0	0	TRUE
Fertilizer Control	42	Radish	0	10	0	0	TRUE
Fertilizer Control	42	Lettuce	0	10	0	0	TRUE
Fertilizer Control	42	Radish	0	10	0	0	TRUE
Fertilizer Control	42	Lettuce	0	10	0	0	TRUE
Fertilizer Control	42	Radish	0	10	0	0	TRUE
Fertilizer Control	42	Lettuce	0	10	0	0	TRUE
Compost without ABX	42	Radish	0	10	0	0	TRUE
Compost without ABX	42	Lettuce	0	10	0	0	TRUE
Compost without ABX	42	Radish	0	10	0	0	TRUE
Compost without ABX	42	Lettuce	0	10	0	0	TRUE
Compost without ABX	42	Radish	0	10	0	0	TRUE
Compost without ABX	42	Lettuce	4	10	40	1.602059991	FALSE
Compost with ABX	42	Radish	0	10	0	0	TRUE
Compost with ABX	42	Lettuce	0	10	0	0	TRUE
Compost with ABX	42	Radish	0	10	0	0	TRUE
Compost with ABX	42	Lettuce	0	10	0	0	TRUE
Compost with ABX	42	Radish	0	10	0	0	TRUE
Compost with ABX	42	Lettuce	0	10	0	0	TRUE
Manure with ABX	42	Radish	0	10	0	0	TRUE

Manure with ABX	42	Lettuce	0	10	0	0	TRUE
Manure with ABX	42	Radish	0	10	0	0	TRUE
Manure with ABX	42	Lettuce	0	10	0	0	TRUE
Manure with ABX	42	Radish	0	10	0	0	TRUE
Manure with ABX	42	Lettuce	3	10	30	1.477121255	FALSE
No Amendment Control	42	None	0	10	0	0	TRUE
No Amendment Control	42	None	0	10	0	0	TRUE
No Amendment Control	42	None	0	10	0	0	TRUE
Fertilizer Control	42	Radish	0	10	0	0	TRUE
Fertilizer Control	42	Lettuce	0	10	0	0	TRUE
Fertilizer Control	42	Radish	0	10	0	0	TRUE
Fertilizer Control	42	Lettuce	0	10	0	0	TRUE
Fertilizer Control	42	Radish	0	10	0	0	TRUE
Fertilizer Control	42	Lettuce	0	10	0	0	TRUE
Compost without ABX	42	Radish	0	10	0	0	TRUE
Compost without ABX	42	Lettuce	0	10	0	0	TRUE
Compost without ABX	42	Radish	0	10	0	0	TRUE
Compost without ABX	42	Lettuce	0	10	0	0	TRUE
Compost without ABX	42	Radish	0	10	0	0	TRUE
Compost without ABX	42	Lettuce	0	10	0	0	TRUE
Compost with ABX	42	Radish	0	10	0	0	TRUE
Compost with ABX	42	Lettuce	0	10	0	0	TRUE
Compost with ABX	42	Radish	0	10	0	0	TRUE
Compost with ABX	42	Lettuce	0	10	0	0	TRUE
Compost with ABX	42	Radish	0	10	0	0	TRUE
Compost with ABX	42	Lettuce	0	10	0	0	TRUE
Manure with ABX	42	Radish	0	10	0	0	TRUE

Manure with ABX	42	Lettuce	0	10	0	0	TRUE
Manure with ABX	42	Radish	0	10	0	0	TRUE
Manure with ABX	42	Lettuce	0	10	0	0	TRUE
Manure with ABX	42	Radish	0	10	0	0	TRUE
Manure with ABX	42	Lettuce	2	10	20	1.301029996	FALSE
No Amendment Control	56	None	0	10	0	0	TRUE
No Amendment Control	56	None	0	10	0	0	TRUE
No Amendment Control	56	None	0	10	0	0	TRUE
Fertilizer Control	56	Radish	0	10	0	0	TRUE
Fertilizer Control	56	Lettuce	0	10	0	0	TRUE
Fertilizer Control	56	Radish	0	10	0	0	TRUE
Fertilizer Control	56	Lettuce	0	10	0	0	TRUE
Fertilizer Control	56	Radish	0	10	0	0	TRUE
Fertilizer Control	56	Lettuce	0	10	0	0	TRUE
Compost without ABX	56	Radish	0	10	0	0	TRUE
Compost without ABX	56	Lettuce	0	10	0	0	TRUE
Compost without ABX	56	Radish	0	10	0	0	TRUE
Compost without ABX	56	Lettuce	0	10	0	0	TRUE
Compost without ABX	56	Radish	0	10	0	0	TRUE
Compost without ABX	56	Lettuce	0	10	0	0	TRUE
Compost with ABX	56	Radish	2	10	20	1.301029996	FALSE
Compost with ABX	56	Lettuce	0	10	0	0	TRUE
Compost with ABX	56	Radish	0	10	0	0	TRUE
Compost with ABX	56	Lettuce	0	10	0	0	TRUE
Compost with ABX	56	Radish	0	10	0	0	TRUE
Compost with ABX	56	Lettuce	0	10	0	0	TRUE
Manure with ABX	56	Radish	0	10	0	0	TRUE

Manure with ABX	56	Lettuce	0	10	0	0	TRUE
Manure with ABX	56	Radish	0	10	0	0	TRUE
Manure with ABX	56	Lettuce	0	10	0	0	TRUE
Manure with ABX	56	Radish	0	10	0	0	TRUE
Manure with ABX	56	Lettuce	0	10	0	0	TRUE
No Amendment Control	56	None	0	10	0	0	TRUE
No Amendment Control	56	None	0	10	0	0	TRUE
No Amendment Control	56	None	0	10	0	0	TRUE
Fertilizer Control	56	Radish	0	10	0	0	TRUE
Fertilizer Control	56	Lettuce	0	10	0	0	TRUE
Fertilizer Control	56	Radish	0	10	0	0	TRUE
Fertilizer Control	56	Lettuce	0	10	0	0	TRUE
Fertilizer Control	56	Radish	0	10	0	0	TRUE
Fertilizer Control	56	Lettuce	1	10	10	1	FALSE
Compost without ABX	56	Radish	0	10	0	0	TRUE
Compost without ABX	56	Lettuce	0	10	0	0	TRUE
Compost without ABX	56	Radish	0	10	0	0	TRUE
Compost without ABX	56	Lettuce	0	10	0	0	TRUE
Compost without ABX	56	Radish	0	10	0	0	TRUE
Compost without ABX	56	Lettuce	0	10	0	0	TRUE
Compost with ABX	56	Radish	0	10	0	0	TRUE
Compost with ABX	56	Lettuce	0	10	0	0	TRUE
Compost with ABX	56	Radish	0	10	0	0	TRUE
Compost with ABX	56	Lettuce	0	10	0	0	TRUE
Compost with ABX	56	Radish	0	10	0	0	TRUE
Compost with ABX	56	Lettuce	0	10	0	0	TRUE
Manure with ABX	56	Radish	0	10	0	0	TRUE

Manure with ABX	56	Lettuce	0	10	0	0	TRUE
Manure with ABX	56	Radish	0	10	0	0	TRUE
Manure with ABX	56	Lettuce	0	10	0	0	TRUE
Manure with ABX	56	Radish	0	10	0	0	TRUE
Manure with ABX	56	Lettuce	0	10	0	0	TRUE
No Amendment Control	56	None	0	10	0	0	TRUE
No Amendment Control	56	None	0	10	0	0	TRUE
No Amendment Control	56	None	0	10	0	0	TRUE
Fertilizer Control	56	Radish	0	10	0	0	TRUE
Fertilizer Control	56	Lettuce	0	10	0	0	TRUE
Fertilizer Control	56	Radish	0	10	0	0	TRUE
Fertilizer Control	56	Lettuce	0	10	0	0	TRUE
Fertilizer Control	56	Radish	0	10	0	0	TRUE
Fertilizer Control	56	Lettuce	0	10	0	0	TRUE
Compost without ABX	56	Radish	0	10	0	0	TRUE
Compost without ABX	56	Lettuce	0	10	0	0	TRUE
Compost without ABX	56	Radish	0	10	0	0	TRUE
Compost without ABX	56	Lettuce	0	10	0	0	TRUE
Compost without ABX	56	Radish	0	10	0	0	TRUE
Compost without ABX	56	Lettuce	0	10	0	0	TRUE
Compost with ABX	56	Radish	0	10	0	0	TRUE
Compost with ABX	56	Lettuce	0	10	0	0	TRUE
Compost with ABX	56	Radish	0	10	0	0	TRUE
Compost with ABX	56	Lettuce	0	10	0	0	TRUE
Compost with ABX	56	Radish	0	10	0	0	TRUE
Compost with ABX	56	Lettuce	0	10	0	0	TRUE
Manure with ABX	56	Radish	0	10	0	0	TRUE

Manure with ABX	56	Lettuce	0	10	0	0	TRUE
Manure with ABX	56	Radish	0	10	0	0	TRUE
Manure with ABX	56	Lettuce	0	10	0	0	TRUE
Manure with ABX	56	Radish	0	10	0	0	TRUE
Manure with ABX	56	Lettuce	0	10	0	0	TRUE
No Amendment Control	90	None	0	10	0	0	TRUE
No Amendment Control	90	None	0	10	0	0	TRUE
No Amendment Control	90	None	0	10	0	0	TRUE
Fertilizer Control	90	Radish	0	10	0	0	TRUE
Fertilizer Control	90	Lettuce	0	10	0	0	TRUE
Fertilizer Control	90	Radish	0	10	0	0	TRUE
Fertilizer Control	90	Lettuce	0	10	0	0	TRUE
Fertilizer Control	90	Radish	0	10	0	0	TRUE
Fertilizer Control	90	Lettuce	0	10	0	0	TRUE
Compost without ABX	90	Radish	0	10	0	0	TRUE
Compost without ABX	90	Lettuce	0	10	0	0	TRUE
Compost without ABX	90	Radish	0	10	0	0	TRUE
Compost without ABX	90	Lettuce	2	10	20	1.301029996	FALSE
Compost without ABX	90	Radish	0	10	0	0	TRUE
Compost without ABX	90	Lettuce	0	10	0	0	TRUE
Compost with ABX	90	Radish	0	10	0	0	TRUE
Compost with ABX	90	Lettuce	0	10	0	0	TRUE
Compost with ABX	90	Radish	0	10	0	0	TRUE
Compost with ABX	90	Lettuce	0	10	0	0	TRUE
Compost with ABX	90	Radish	0	10	0	0	TRUE
Compost with ABX	90	Lettuce	0	10	0	0	TRUE
Manure with ABX	90	Radish	0	10	0	0	TRUE

Manure with ABX	90	Lettuce	0	10	0	0	TRUE
Manure with ABX	90	Radish	0	10	0	0	TRUE
Manure with ABX	90	Lettuce	0	10	0	0	TRUE
Manure with ABX	90	Radish	0	10	0	0	TRUE
Manure with ABX	90	Lettuce	328	100	32800	4.515873844	FALSE
No Amendment Control	90	None	0	10	0	0	TRUE
No Amendment Control	90	None	0	10	0	0	TRUE
No Amendment Control	90	None	0	10	0	0	TRUE
Fertilizer Control	90	Radish	0	10	0	0	TRUE
Fertilizer Control	90	Lettuce	0	10	0	0	TRUE
Fertilizer Control	90	Radish	0	10	0	0	TRUE
Fertilizer Control	90	Lettuce	0	10	0	0	TRUE
Fertilizer Control	90	Radish	0	10	0	0	TRUE
Fertilizer Control	90	Lettuce	0	10	0	0	TRUE
Compost without ABX	90	Radish	0	10	0	0	TRUE
Compost without ABX	90	Lettuce	0	10	0	0	TRUE
Compost without ABX	90	Radish	0	10	0	0	TRUE
Compost without ABX	90	Lettuce	0	10	0	0	TRUE
Compost without ABX	90	Radish	0	10	0	0	TRUE
Compost without ABX	90	Lettuce	0	10	0	0	TRUE
Compost with ABX	90	Radish	0	10	0	0	TRUE
Compost with ABX	90	Lettuce	0	10	0	0	TRUE
Compost with ABX	90	Radish	0	10	0	0	TRUE
Compost with ABX	90	Lettuce	0	10	0	0	TRUE
Compost with ABX	90	Radish	0	10	0	0	TRUE
Compost with ABX	90	Lettuce	0	10	0	0	TRUE
Manure with ABX	90	Radish	0	10	0	0	TRUE

Manure with ABX	90	Lettuce	0	10	0	0	TRUE
Manure with ABX	90	Radish	0	10	0	0	TRUE
Manure with ABX	90	Lettuce	0	10	0	0	TRUE
Manure with ABX	90	Radish	0	10	0	0	TRUE
Manure with ABX	90	Lettuce	204	100	20400	4.309630167	FALSE
No Amendment Control	90	None	0	10	0	0	TRUE
No Amendment Control	90	None	0	10	0	0	TRUE
No Amendment Control	90	None	0	10	0	0	TRUE
Fertilizer Control	90	Radish	0	10	0	0	TRUE
Fertilizer Control	90	Lettuce	0	10	0	0	TRUE
Fertilizer Control	90	Radish	0	10	0	0	TRUE
Fertilizer Control	90	Lettuce	0	10	0	0	TRUE
Fertilizer Control	90	Radish	0	10	0	0	TRUE
Fertilizer Control	90	Lettuce	0	10	0	0	TRUE
Compost without ABX	90	Radish	0	10	0	0	TRUE
Compost without ABX	90	Lettuce	0	10	0	0	TRUE
Compost without ABX	90	Radish	0	10	0	0	TRUE
Compost without ABX	90	Lettuce	3	10	30	1.477121255	FALSE
Compost without ABX	90	Radish	0	10	0	0	TRUE
Compost without ABX	90	Lettuce	0	10	0	0	TRUE
Compost with ABX	90	Radish	0	10	0	0	TRUE
Compost with ABX	90	Lettuce	0	10	0	0	TRUE
Compost with ABX	90	Radish	0	10	0	0	TRUE
Compost with ABX	90	Lettuce	0	10	0	0	TRUE
Compost with ABX	90	Radish	0	10	0	0	TRUE
Compost with ABX	90	Lettuce	0	10	0	0	TRUE
Manure with ABX	90	Radish	0	10	0	0	TRUE

Manure with ABX	90	Lettuce	0	10	0	0	TRUE
Manure with ABX	90	Radish	0	10	0	0	TRUE
Manure with ABX	90	Lettuce	0	10	0	0	TRUE
Manure with ABX	90	Radish	0	10	0	0	TRUE
Manure with ABX	90	Lettuce	269	100	26900	4.42975228	FALSE
No Amendment Control	120	None	39	100	3900	3.591064607	FALSE
No Amendment Control	120	None	0	10	0	0	TRUE
No Amendment Control	120	None	68	100	6800	3.832508913	FALSE
Fertilizer Control	120	Radish	44	100	4400	3.643452676	FALSE
Fertilizer Control	120	Lettuce	0	10	0	0	TRUE
Fertilizer Control	120	Radish	0	10	0	0	TRUE
Fertilizer Control	120	Lettuce	0	10	0	0	TRUE
Fertilizer Control	120	Radish	0	10	0	0	TRUE
Fertilizer Control	120	Lettuce	0	10	0	0	TRUE
Compost without ABX	120	Radish	0	10	0	0	TRUE
Compost without ABX	120	Lettuce	0	10	0	0	TRUE
Compost without ABX	120	Radish	0	10	0	0	TRUE
Compost without ABX	120	Lettuce	0	10	0	0	TRUE
Compost without ABX	120	Radish	0	10	0	0	TRUE
Compost without ABX	120	Lettuce	0	10	0	0	TRUE
Compost with ABX	120	Radish	0	10	0	0	TRUE
Compost with ABX	120	Lettuce	0	10	0	0	TRUE
Compost with ABX	120	Radish	0	10	0	0	TRUE
Compost with ABX	120	Lettuce	0	10	0	0	TRUE
Compost with ABX	120	Radish	8	100	800	2.903089987	FALSE
Compost with ABX	120	Lettuce	0	10	0	0	TRUE
Manure with ABX	120	Radish	0	10	0	0	TRUE

Manure with ABX	120	Lettuce	0	10	0	0	TRUE
Manure with ABX	120	Radish	0	10	0	0	TRUE
Manure with ABX	120	Lettuce	145	100	14500	4.161368002	FALSE
Manure with ABX	120	Radish	0	10	0	0	TRUE
Manure with ABX	120	Lettuce	32	100	320	2.505149978	FALSE
No Amendment Control	120	None	17	100	1700	3.230448921	FALSE
No Amendment Control	120	None	7	10	70	1.84509804	FALSE
No Amendment Control	120	None	91	100	9100	3.959041392	FALSE
Fertilizer Control	120	Radish	44	100	4400	3.643452676	FALSE
Fertilizer Control	120	Lettuce	0	10	0	0	TRUE
Fertilizer Control	120	Radish	0	10	0	0	TRUE
Fertilizer Control	120	Lettuce	0	10	0	0	TRUE
Fertilizer Control	120	Radish	0	10	0	0	TRUE
Fertilizer Control	120	Lettuce	0	10	0	0	TRUE
Compost without ABX	120	Radish	0	10	0	0	TRUE
Compost without ABX	120	Lettuce	0	10	0	0	TRUE
Compost without ABX	120	Radish	0	10	0	0	TRUE
Compost without ABX	120	Lettuce	0	10	0	0	TRUE
Compost without ABX	120	Radish	0	10	0	0	TRUE
Compost without ABX	120	Lettuce	0	10	0	0	TRUE
Compost with ABX	120	Radish	0	10	0	0	TRUE
Compost with ABX	120	Lettuce	0	10	0	0	TRUE
Compost with ABX	120	Radish	0	10	0	0	TRUE
Compost with ABX	120	Lettuce	0	10	0	0	TRUE
Compost with ABX	120	Radish	5	100	500	2.698970004	FALSE
Compost with ABX	120	Lettuce	0	10	0	0	TRUE
Manure with ABX	120	Radish	0	10	0	0	TRUE

Manure with ABX	120	Lettuce	0	10	0	0	TRUE
Manure with ABX	120	Radish	0	10	0	0	TRUE
Manure with ABX	120	Lettuce	0	10	0	0	TRUE
Manure with ABX	120	Radish	0	10	0	0	TRUE
Manure with ABX	120	Lettuce	0	10	0	0	TRUE
No Amendment Control	120	None	15	100	1500	3.176091259	FALSE
No Amendment Control	120	None	3	10	30	1.477121255	FALSE
No Amendment Control	120	None	61	100	6100	3.785329835	FALSE
Fertilizer Control	120	Radish	54	100	5400	3.73239376	FALSE
Fertilizer Control	120	Lettuce	1	10	10	1	FALSE
Fertilizer Control	120	Radish	0	10	0	0	TRUE
Fertilizer Control	120	Lettuce	0	10	0	0	TRUE
Fertilizer Control	120	Radish	0	10	0	0	TRUE
Fertilizer Control	120	Lettuce	0	10	0	0	TRUE
Compost without ABX	120	Radish	2	100	200	2.301029996	FALSE
Compost without ABX	120	Lettuce	0	10	0	0	TRUE
Compost without ABX	120	Radish	0	10	0	0	TRUE
Compost without ABX	120	Lettuce	0	10	0	0	TRUE
Compost without ABX	120	Radish	0	10	0	0	TRUE
Compost without ABX	120	Lettuce	0	10	0	0	TRUE
Compost with ABX	120	Radish	0	10	0	0	TRUE
Compost with ABX	120	Lettuce	0	10	0	0	TRUE
Compost with ABX	120	Radish	0	10	0	0	TRUE
Compost with ABX	120	Lettuce	0	10	0	0	TRUE
Compost with ABX	120	Radish	13	100	1300	3.113943352	FALSE
Compost with ABX	120	Lettuce	0	10	0	0	TRUE
Manure with ABX	120	Radish	0	10	0	0	TRUE

Manure with ABX	120	Lettuce	0	10	0	0	TRUE
Manure with ABX	120	Radish	0	10	0	0	TRUE
Manure with ABX	120	Lettuce	0	10	0	0	TRUE
Manure with ABX	120	Radish	0	10	0	0	TRUE
Manure with ABX	120	Lettuce	0	10	0	0	TRUE

APPENDIX M. Raw Data: Colony Counts from Sulfamethoxazole MacConkey Agar Plates for entire study.

Table M.1. Table I.1. Colony counts, dilution, and CFU's for Day -1, 0, 7, 28, 42, 56, 90, and 120 sulfamethoxazole plates.

Treatment	Time	Vegetable	Colonies Counted	CFU E. coli/ g soil	log10 CFU E. coli/ g soil	Censored CFU
No Amendment Control	-1	None	0	0	0	TRUE
No Amendment Control	-1	None	0	0	0	TRUE
No Amendment Control	-1	None	0	0	0	TRUE
Fertilizer Control	-1	Radish	0	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	0	0	TRUE
Fertilizer Control	-1	Radish	0	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	0	0	TRUE
Fertilizer Control	-1	Radish	0	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	0	0	TRUE
Compost without ABX	-1	Radish	0	0	0	TRUE
Compost without ABX	-1	Lettuce	0	0	0	TRUE
Compost without ABX	-1	Radish	0	0	0	TRUE
Compost without ABX	-1	Lettuce	0	0	0	TRUE
Compost without ABX	-1	Radish	0	0	0	TRUE
Compost without ABX	-1	Lettuce	0	0	0	TRUE
Compost with ABX	-1	Radish	0	0	0	TRUE
Compost with ABX	-1	Lettuce	0	0	0	TRUE
Compost with ABX	-1	Radish	0	0	0	TRUE
Compost with ABX	-1	Lettuce	0	0	0	TRUE
Compost with ABX	-1	Radish	0	0	0	TRUE
Compost with ABX	-1	Lettuce	0	0	0	TRUE
Manure with ABX	-1	Radish	0	0	0	TRUE

Manure with ABX	-1	Lettuce	0	0	0	TRUE
Manure with ABX	-1	Radish	0	0	0	TRUE
Manure with ABX	-1	Lettuce	0	0	0	TRUE
Manure with ABX	-1	Radish	0	0	0	TRUE
Manure with ABX	-1	Lettuce	0	0	0	TRUE
No Amendment Control	-1	None	0	0	0	TRUE
No Amendment Control	-1	None	0	0	0	TRUE
No Amendment Control	-1	None	0	0	0	TRUE
Fertilizer Control	-1	Radish	0	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	0	0	TRUE
Fertilizer Control	-1	Radish	0	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	0	0	TRUE
Fertilizer Control	-1	Radish	0	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	0	0	TRUE
Compost without ABX	-1	Radish	0	0	0	TRUE
Compost without ABX	-1	Lettuce	0	0	0	TRUE
Compost without ABX	-1	Radish	0	0	0	TRUE
Compost without ABX	-1	Lettuce	0	0	0	TRUE
Compost without ABX	-1	Radish	0	0	0	TRUE
Compost without ABX	-1	Lettuce	0	0	0	TRUE
Compost with ABX	-1	Radish	0	0	0	TRUE
Compost with ABX	-1	Lettuce	0	0	0	TRUE
Compost with ABX	-1	Radish	0	0	0	TRUE
Compost with ABX	-1	Lettuce	0	0	0	TRUE
Compost with ABX	-1	Radish	0	0	0	TRUE
Compost with ABX	-1	Lettuce	0	0	0	TRUE
Manure with ABX	-1	Radish	0	0	0	TRUE

Manure with ABX	-1	Lettuce	0	0	0	TRUE
Manure with ABX	-1	Radish	0	0	0	TRUE
Manure with ABX	-1	Lettuce	0	0	0	TRUE
Manure with ABX	-1	Radish	0	0	0	TRUE
Manure with ABX	-1	Lettuce	0	0	0	TRUE
No Amendment Control	-1	None	0	0	0	TRUE
No Amendment Control	-1	None	0	0	0	TRUE
No Amendment Control	-1	None	0	0	0	TRUE
Fertilizer Control	-1	Radish	0	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	0	0	TRUE
Fertilizer Control	-1	Radish	0	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	0	0	TRUE
Fertilizer Control	-1	Radish	0	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	0	0	TRUE
Compost without ABX	-1	Radish	0	0	0	TRUE
Compost without ABX	-1	Lettuce	0	0	0	TRUE
Compost without ABX	-1	Radish	0	0	0	TRUE
Compost without ABX	-1	Lettuce	0	0	0	TRUE
Compost without ABX	-1	Radish	0	0	0	TRUE
Compost without ABX	-1	Lettuce	0	0	0	TRUE
Compost with ABX	-1	Radish	0	0	0	TRUE
Compost with ABX	-1	Lettuce	0	0	0	TRUE
Compost with ABX	-1	Radish	0	0	0	TRUE
Compost with ABX	-1	Lettuce	0	0	0	TRUE
Compost with ABX	-1	Radish	0	0	0	TRUE
Compost with ABX	-1	Lettuce	0	0	0	TRUE
Manure with ABX	-1	Radish	0	0	0	TRUE

Manure with ABX	-1	Lettuce	0	0	0	TRUE
Manure with ABX	-1	Radish	0	0	0	TRUE
Manure with ABX	-1	Lettuce	0	0	0	TRUE
Manure with ABX	-1	Radish	0	0	0	TRUE
Manure with ABX	-1	Lettuce	0	0	0	TRUE
No Amendment Control	0	None	0	0	0	TRUE
No Amendment Control	0	None	0	0	0	TRUE
No Amendment Control	0	None	0	0	0	TRUE
Fertilizer Control	0	Radish	0	0	0	TRUE
Fertilizer Control	0	Lettuce	0	0	0	TRUE
Fertilizer Control	0	Radish	0	0	0	TRUE
Fertilizer Control	0	Lettuce	0	0	0	TRUE
Fertilizer Control	0	Radish	0	0	0	TRUE
Fertilizer Control	0	Lettuce	0	0	0	TRUE
Compost without ABX	0	Radish	0	0	0	TRUE
Compost without ABX	0	Lettuce	0	0	0	TRUE
Compost without ABX	0	Radish	0	0	0	TRUE
Compost without ABX	0	Lettuce	0	0	0	TRUE
Compost without ABX	0	Radish	0	0	0	TRUE
Compost without ABX	0	Lettuce	0	0	0	TRUE
Compost with ABX	0	Radish	0	0	0	TRUE
Compost with ABX	0	Lettuce	0	0	0	TRUE
Compost with ABX	0	Radish	0	0	0	TRUE
Compost with ABX	0	Lettuce	0	0	0	TRUE
Compost with ABX	0	Radish	0	0	0	TRUE
Compost with ABX	0	Lettuce	0	0	0	TRUE
Manure with ABX	0	Radish	16	1600	3.204119983	FALSE

Manure with ABX	0	Lettuce	11	1100	3.041392685	FALSE
Manure with ABX	0	Radish	1	100	2	FALSE
Manure with ABX	0	Lettuce	1	100	2	FALSE
Manure with ABX	0	Radish	118	11800	4.071882007	FALSE
Manure with ABX	0	Lettuce	0	0	0	TRUE
No Amendment Control	0	None	0	0	0	TRUE
No Amendment Control	0	None	0	0	0	TRUE
No Amendment Control	0	None	0	0	0	TRUE
Fertilizer Control	0	Radish	0	0	0	TRUE
Fertilizer Control	0	Lettuce	0	0	0	TRUE
Fertilizer Control	0	Radish	0	0	0	TRUE
Fertilizer Control	0	Lettuce	0	0	0	TRUE
Fertilizer Control	0	Radish	0	0	0	TRUE
Fertilizer Control	0	Lettuce	0	0	0	TRUE
Compost without ABX	0	Radish	0	0	0	TRUE
Compost without ABX	0	Lettuce	0	0	0	TRUE
Compost without ABX	0	Radish	0	0	0	TRUE
Compost without ABX	0	Lettuce	0	0	0	TRUE
Compost without ABX	0	Radish	0	0	0	TRUE
Compost without ABX	0	Lettuce	0	0	0	TRUE
Compost with ABX	0	Radish	0	0	0	TRUE
Compost with ABX	0	Lettuce	0	0	0	TRUE
Compost with ABX	0	Radish	0	0	0	TRUE
Compost with ABX	0	Lettuce	0	0	0	TRUE
Compost with ABX	0	Radish	0	0	0	TRUE
Compost with ABX	0	Lettuce	0	0	0	TRUE
Manure with ABX	0	Radish	17	1700	3.230448921	FALSE

Manure with ABX	0	Lettuce	10	1000	3	FALSE
Manure with ABX	0	Radish	2	200	2.301029996	FALSE
Manure with ABX	0	Lettuce	0	0	0	TRUE
Manure with ABX	0	Radish	147	14700	4.167317335	FALSE
Manure with ABX	0	Lettuce	0	0	0	TRUE
No Amendment Control	0	None	0	0	0	TRUE
No Amendment Control	0	None	0	0	0	TRUE
No Amendment Control	0	None	0	0	0	TRUE
Fertilizer Control	0	Radish	0	0	0	TRUE
Fertilizer Control	0	Lettuce	0	0	0	TRUE
Fertilizer Control	0	Radish	0	0	0	TRUE
Fertilizer Control	0	Lettuce	0	0	0	TRUE
Fertilizer Control	0	Radish	0	0	0	TRUE
Fertilizer Control	0	Lettuce	0	0	0	TRUE
Compost without ABX	0	Radish	0	0	0	TRUE
Compost without ABX	0	Lettuce	0	0	0	TRUE
Compost without ABX	0	Radish	0	0	0	TRUE
Compost without ABX	0	Lettuce	0	0	0	TRUE
Compost without ABX	0	Radish	0	0	0	TRUE
Compost without ABX	0	Lettuce	0	0	0	TRUE
Compost with ABX	0	Radish	0	0	0	TRUE
Compost with ABX	0	Lettuce	0	0	0	TRUE
Compost with ABX	0	Radish	0	0	0	TRUE
Compost with ABX	0	Lettuce	0	0	0	TRUE
Compost with ABX	0	Radish	0	0	0	TRUE
Compost with ABX	0	Lettuce	0	0	0	TRUE
Manure with ABX	0	Radish	1	100	2	FALSE

Manure with ABX	0	Lettuce	0	0	0	TRUE
Manure with ABX	0	Radish	0	0	0	TRUE
Manure with ABX	0	Lettuce	0	0	0	TRUE
Manure with ABX	0	Radish	99	9900	3.995635195	FALSE
Manure with ABX	0	Lettuce	1	100	2	FALSE
No Amendment Control	7	None	0	0	0	TRUE
No Amendment Control	7	None	0	0	0	TRUE
No Amendment Control	7	None	0	0	0	TRUE
Fertilizer Control	7	Radish	0	0	0	TRUE
Fertilizer Control	7	Lettuce	0	0	0	TRUE
Fertilizer Control	7	Radish	0	0	0	TRUE
Fertilizer Control	7	Lettuce	0	0	0	TRUE
Fertilizer Control	7	Radish	0	0	0	TRUE
Fertilizer Control	7	Lettuce	0	0	0	TRUE
Compost without ABX	7	Radish	0	0	0	TRUE
Compost without ABX	7	Lettuce	0	0	0	TRUE
Compost without ABX	7	Radish	0	0	0	TRUE
Compost without ABX	7	Lettuce	0	0	0	TRUE
Compost without ABX	7	Radish	0	0	0	TRUE
Compost without ABX	7	Lettuce	0	0	0	TRUE
Compost with ABX	7	Radish	0	0	0	TRUE
Compost with ABX	7	Lettuce	0	0	0	TRUE
Compost with ABX	7	Radish	0	0	0	TRUE
Compost with ABX	7	Lettuce	0	0	0	TRUE
Compost with ABX	7	Radish	0	0	0	TRUE
Compost with ABX	7	Lettuce	0	0	0	TRUE
Manure with ABX	7	Radish	0	0	0	TRUE

Manure with ABX	7	Lettuce	0	0	0	TRUE
Manure with ABX	7	Radish	0	0	0	TRUE
Manure with ABX	7	Lettuce	0	0	0	TRUE
Manure with ABX	7	Radish	3	30	1.477121255	FALSE
Manure with ABX	7	Lettuce	0	0	0	TRUE
No Amendment Control	7	None	0	0	0	TRUE
No Amendment Control	7	None	0	0	0	TRUE
No Amendment Control	7	None	0	0	0	TRUE
Fertilizer Control	7	Radish	0	0	0	TRUE
Fertilizer Control	7	Lettuce	0	0	0	TRUE
Fertilizer Control	7	Radish	0	0	0	TRUE
Fertilizer Control	7	Lettuce	0	0	0	TRUE
Fertilizer Control	7	Radish	0	0	0	TRUE
Fertilizer Control	7	Lettuce	0	0	0	TRUE
Compost without ABX	7	Radish	0	0	0	TRUE
Compost without ABX	7	Lettuce	0	0	0	TRUE
Compost without ABX	7	Radish	0	0	0	TRUE
Compost without ABX	7	Lettuce	0	0	0	TRUE
Compost without ABX	7	Radish	0	0	0	TRUE
Compost without ABX	7	Lettuce	0	0	0	TRUE
Compost with ABX	7	Radish	0	0	0	TRUE
Compost with ABX	7	Lettuce	0	0	0	TRUE
Compost with ABX	7	Radish	0	0	0	TRUE
Compost with ABX	7	Lettuce	0	0	0	TRUE
Compost with ABX	7	Radish	0	0	0	TRUE
Compost with ABX	7	Lettuce	0	0	0	TRUE
Manure with ABX	7	Radish	0	0	0	TRUE

Manure with ABX	7	Lettuce	0	0	0	TRUE
Manure with ABX	7	Radish	0	0	0	TRUE
Manure with ABX	7	Lettuce	0	0	0	TRUE
Manure with ABX	7	Radish	40	400	2.602059991	FALSE
Manure with ABX	7	Lettuce	0	0	0	TRUE
No Amendment Control	7	None	0	0	0	TRUE
No Amendment Control	7	None	0	0	0	TRUE
No Amendment Control	7	None	0	0	0	TRUE
Fertilizer Control	7	Radish	0	0	0	TRUE
Fertilizer Control	7	Lettuce	0	0	0	TRUE
Fertilizer Control	7	Radish	0	0	0	TRUE
Fertilizer Control	7	Lettuce	0	0	0	TRUE
Fertilizer Control	7	Radish	0	0	0	TRUE
Fertilizer Control	7	Lettuce	0	0	0	TRUE
Compost without ABX	7	Radish	0	0	0	TRUE
Compost without ABX	7	Lettuce	0	0	0	TRUE
Compost without ABX	7	Radish	0	0	0	TRUE
Compost without ABX	7	Lettuce	0	0	0	TRUE
Compost without ABX	7	Radish	0	0	0	TRUE
Compost without ABX	7	Lettuce	0	0	0	TRUE
Compost with ABX	7	Radish	0	0	0	TRUE
Compost with ABX	7	Lettuce	0	0	0	TRUE
Compost with ABX	7	Radish	0	0	0	TRUE
Compost with ABX	7	Lettuce	0	0	0	TRUE
Compost with ABX	7	Radish	0	0	0	TRUE
Compost with ABX	7	Lettuce	0	0	0	TRUE
Manure with ABX	7	Radish	0	0	0	TRUE

Manure with ABX	7	Lettuce	0	0	0	TRUE
Manure with ABX	7	Radish	0	0	0	TRUE
Manure with ABX	7	Lettuce	0	0	0	TRUE
Manure with ABX	7	Radish	0	0	0	TRUE
Manure with ABX	7	Lettuce	0	0	0	TRUE
No Amendment Control	28	None	0	0	0	TRUE
No Amendment Control	28	None	0	0	0	TRUE
No Amendment Control	28	None	0	0	0	TRUE
Fertilizer Control	28	Radish	0	0	0	TRUE
Fertilizer Control	28	Lettuce	0	0	0	TRUE
Fertilizer Control	28	Radish	0	0	0	TRUE
Fertilizer Control	28	Lettuce	0	0	0	TRUE
Fertilizer Control	28	Radish	0	0	0	TRUE
Fertilizer Control	28	Lettuce	0	0	0	TRUE
Compost without ABX	28	Radish	0	0	0	TRUE
Compost without ABX	28	Lettuce	0	0	0	TRUE
Compost without ABX	28	Radish	0	0	0	TRUE
Compost without ABX	28	Lettuce	0	0	0	TRUE
Compost without ABX	28	Radish	0	0	0	TRUE
Compost without ABX	28	Lettuce	0	0	0	TRUE
Compost with ABX	28	Radish	0	0	0	TRUE
Compost with ABX	28	Lettuce	0	0	0	TRUE
Compost with ABX	28	Radish	0	0	0	TRUE
Compost with ABX	28	Lettuce	0	0	0	TRUE
Compost with ABX	28	Radish	0	0	0	TRUE
Compost with ABX	28	Lettuce	0	0	0	TRUE
Manure with ABX	28	Radish	0	0	0	TRUE

Manure with ABX	28	Lettuce	0	0	0	TRUE
Manure with ABX	28	Radish	0	0	0	TRUE
Manure with ABX	28	Lettuce	0	0	0	TRUE
Manure with ABX	28	Radish	0	0	0	TRUE
Manure with ABX	28	Lettuce	0	0	0	TRUE
No Amendment Control	28	None	0	0	0	TRUE
No Amendment Control	28	None	0	0	0	TRUE
No Amendment Control	28	None	0	0	0	TRUE
Fertilizer Control	28	Radish	0	0	0	TRUE
Fertilizer Control	28	Lettuce	0	0	0	TRUE
Fertilizer Control	28	Radish	0	0	0	TRUE
Fertilizer Control	28	Lettuce	0	0	0	TRUE
Fertilizer Control	28	Radish	0	0	0	TRUE
Fertilizer Control	28	Lettuce	0	0	0	TRUE
Compost without ABX	28	Radish	0	0	0	TRUE
Compost without ABX	28	Lettuce	0	0	0	TRUE
Compost without ABX	28	Radish	0	0	0	TRUE
Compost without ABX	28	Lettuce	0	0	0	TRUE
Compost without ABX	28	Radish	0	0	0	TRUE
Compost without ABX	28	Lettuce	0	0	0	TRUE
Compost with ABX	28	Radish	0	0	0	TRUE
Compost with ABX	28	Lettuce	0	0	0	TRUE
Compost with ABX	28	Radish	0	0	0	TRUE
Compost with ABX	28	Lettuce	0	0	0	TRUE
Compost with ABX	28	Radish	0	0	0	TRUE
Compost with ABX	28	Lettuce	0	0	0	TRUE
Manure with ABX	28	Radish	0	0	0	TRUE

Manure with ABX	28	Lettuce	0	0	0	TRUE
Manure with ABX	28	Radish	0	0	0	TRUE
Manure with ABX	28	Lettuce	0	0	0	TRUE
Manure with ABX	28	Radish	0	0	0	TRUE
Manure with ABX	28	Lettuce	0	0	0	TRUE
No Amendment Control	28	None	0	0	0	TRUE
No Amendment Control	28	None	0	0	0	TRUE
No Amendment Control	28	None	0	0	0	TRUE
Fertilizer Control	28	Radish	0	0	0	TRUE
Fertilizer Control	28	Lettuce	0	0	0	TRUE
Fertilizer Control	28	Radish	0	0	0	TRUE
Fertilizer Control	28	Lettuce	0	0	0	TRUE
Fertilizer Control	28	Radish	0	0	0	TRUE
Fertilizer Control	28	Lettuce	0	0	0	TRUE
Compost without ABX	28	Radish	0	0	0	TRUE
Compost without ABX	28	Lettuce	0	0	0	TRUE
Compost without ABX	28	Radish	0	0	0	TRUE
Compost without ABX	28	Lettuce	0	0	0	TRUE
Compost without ABX	28	Radish	0	0	0	TRUE
Compost without ABX	28	Lettuce	0	0	0	TRUE
Compost with ABX	28	Radish	0	0	0	TRUE
Compost with ABX	28	Lettuce	0	0	0	TRUE
Compost with ABX	28	Radish	0	0	0	TRUE
Compost with ABX	28	Lettuce	0	0	0	TRUE
Compost with ABX	28	Radish	0	0	0	TRUE
Compost with ABX	28	Lettuce	0	0	0	TRUE
Manure with ABX	28	Radish	0	0	0	TRUE

Manure with ABX	28	Lettuce	0	0	0	TRUE
Manure with ABX	28	Radish	0	0	0	TRUE
Manure with ABX	28	Lettuce	0	0	0	TRUE
Manure with ABX	28	Radish	0	0	0	TRUE
Manure with ABX	28	Lettuce	0	0	0	TRUE
No Amendment Control	42	None	0	0	0	TRUE
No Amendment Control	42	None	0	0	0	TRUE
No Amendment Control	42	None	0	0	0	TRUE
Fertilizer Control	42	Radish	0	0	0	TRUE
Fertilizer Control	42	Lettuce	0	0	0	TRUE
Fertilizer Control	42	Radish	0	0	0	TRUE
Fertilizer Control	42	Lettuce	0	0	0	TRUE
Fertilizer Control	42	Radish	0	0	0	TRUE
Fertilizer Control	42	Lettuce	0	0	0	TRUE
Compost without ABX	42	Radish	0	0	0	TRUE
Compost without ABX	42	Lettuce	0	0	0	TRUE
Compost without ABX	42	Radish	0	0	0	TRUE
Compost without ABX	42	Lettuce	0	0	0	TRUE
Compost without ABX	42	Radish	0	0	0	TRUE
Compost without ABX	42	Lettuce	0	0	0	TRUE
Compost with ABX	42	Radish	0	0	0	TRUE
Compost with ABX	42	Lettuce	0	0	0	TRUE
Compost with ABX	42	Radish	0	0	0	TRUE
Compost with ABX	42	Lettuce	0	0	0	TRUE
Compost with ABX	42	Radish	0	0	0	TRUE
Compost with ABX	42	Lettuce	0	0	0	TRUE
Manure with ABX	42	Radish	0	0	0	TRUE

Manure with ABX	42	Lettuce	0	0	0	TRUE
Manure with ABX	42	Radish	0	0	0	TRUE
Manure with ABX	42	Lettuce	0	0	0	TRUE
Manure with ABX	42	Radish	0	0	0	TRUE
Manure with ABX	42	Lettuce	0	0	0	TRUE
No Amendment Control	42	None	0	0	0	TRUE
No Amendment Control	42	None	0	0	0	TRUE
No Amendment Control	42	None	0	0	0	TRUE
Fertilizer Control	42	Radish	0	0	0	TRUE
Fertilizer Control	42	Lettuce	0	0	0	TRUE
Fertilizer Control	42	Radish	0	0	0	TRUE
Fertilizer Control	42	Lettuce	0	0	0	TRUE
Fertilizer Control	42	Radish	0	0	0	TRUE
Fertilizer Control	42	Lettuce	0	0	0	TRUE
Compost without ABX	42	Radish	0	0	0	TRUE
Compost without ABX	42	Lettuce	0	0	0	TRUE
Compost without ABX	42	Radish	0	0	0	TRUE
Compost without ABX	42	Lettuce	0	0	0	TRUE
Compost without ABX	42	Radish	0	0	0	TRUE
Compost without ABX	42	Lettuce	0	0	0	TRUE
Compost with ABX	42	Radish	0	0	0	TRUE
Compost with ABX	42	Lettuce	0	0	0	TRUE
Compost with ABX	42	Radish	0	0	0	TRUE
Compost with ABX	42	Lettuce	0	0	0	TRUE
Compost with ABX	42	Radish	0	0	0	TRUE
Compost with ABX	42	Lettuce	0	0	0	TRUE
Manure with ABX	42	Radish	0	0	0	TRUE

Manure with ABX	42	Lettuce	0	0	0	TRUE
Manure with ABX	42	Radish	0	0	0	TRUE
Manure with ABX	42	Lettuce	0	0	0	TRUE
Manure with ABX	42	Radish	0	0	0	TRUE
Manure with ABX	42	Lettuce	0	0	0	TRUE
No Amendment Control	42	None	0	0	0	TRUE
No Amendment Control	42	None	0	0	0	TRUE
No Amendment Control	42	None	0	0	0	TRUE
Fertilizer Control	42	Radish	0	0	0	TRUE
Fertilizer Control	42	Lettuce	0	0	0	TRUE
Fertilizer Control	42	Radish	0	0	0	TRUE
Fertilizer Control	42	Lettuce	0	0	0	TRUE
Fertilizer Control	42	Radish	0	0	0	TRUE
Fertilizer Control	42	Lettuce	0	0	0	TRUE
Compost without ABX	42	Radish	0	0	0	TRUE
Compost without ABX	42	Lettuce	0	0	0	TRUE
Compost without ABX	42	Radish	0	0	0	TRUE
Compost without ABX	42	Lettuce	0	0	0	TRUE
Compost without ABX	42	Radish	0	0	0	TRUE
Compost without ABX	42	Lettuce	0	0	0	TRUE
Compost with ABX	42	Radish	0	0	0	TRUE
Compost with ABX	42	Lettuce	0	0	0	TRUE
Compost with ABX	42	Radish	0	0	0	TRUE
Compost with ABX	42	Lettuce	0	0	0	TRUE
Compost with ABX	42	Radish	0	0	0	TRUE
Compost with ABX	42	Lettuce	0	0	0	TRUE
Manure with ABX	42	Radish	0	0	0	TRUE

Manure with ABX	42	Lettuce	0	0	0	TRUE
Manure with ABX	42	Radish	0	0	0	TRUE
Manure with ABX	42	Lettuce	0	0	0	TRUE
Manure with ABX	42	Radish	0	0	0	TRUE
Manure with ABX	42	Lettuce	0	0	0	TRUE
No Amendment Control	56	None	0	0	0	TRUE
No Amendment Control	56	None	0	0	0	TRUE
No Amendment Control	56	None	0	0	0	TRUE
Fertilizer Control	56	Radish	0	0	0	TRUE
Fertilizer Control	56	Lettuce	0	0	0	TRUE
Fertilizer Control	56	Radish	0	0	0	TRUE
Fertilizer Control	56	Lettuce	0	0	0	TRUE
Fertilizer Control	56	Radish	0	0	0	TRUE
Fertilizer Control	56	Lettuce	0	0	0	TRUE
Compost without ABX	56	Radish	0	0	0	TRUE
Compost without ABX	56	Lettuce	0	0	0	TRUE
Compost without ABX	56	Radish	0	0	0	TRUE
Compost without ABX	56	Lettuce	0	0	0	TRUE
Compost without ABX	56	Radish	0	0	0	TRUE
Compost without ABX	56	Lettuce	0	0	0	TRUE
Compost with ABX	56	Radish	0	0	0	TRUE
Compost with ABX	56	Lettuce	0	0	0	TRUE
Compost with ABX	56	Radish	0	0	0	TRUE
Compost with ABX	56	Lettuce	0	0	0	TRUE
Compost with ABX	56	Radish	0	0	0	TRUE
Compost with ABX	56	Lettuce	0	0	0	TRUE
Manure with ABX	56	Radish	0	0	0	TRUE

Manure with ABX	56	Lettuce	0	0	0	TRUE
Manure with ABX	56	Radish	0	0	0	TRUE
Manure with ABX	56	Lettuce	0	0	0	TRUE
Manure with ABX	56	Radish	0	0	0	TRUE
Manure with ABX	56	Lettuce	0	0	0	TRUE
No Amendment Control	56	None	0	0	0	TRUE
No Amendment Control	56	None	0	0	0	TRUE
No Amendment Control	56	None	0	0	0	TRUE
Fertilizer Control	56	Radish	0	0	0	TRUE
Fertilizer Control	56	Lettuce	0	0	0	TRUE
Fertilizer Control	56	Radish	0	0	0	TRUE
Fertilizer Control	56	Lettuce	0	0	0	TRUE
Fertilizer Control	56	Radish	0	0	0	TRUE
Fertilizer Control	56	Lettuce	0	0	0	TRUE
Compost without ABX	56	Radish	0	0	0	TRUE
Compost without ABX	56	Lettuce	0	0	0	TRUE
Compost without ABX	56	Radish	0	0	0	TRUE
Compost without ABX	56	Lettuce	0	0	0	TRUE
Compost without ABX	56	Radish	0	0	0	TRUE
Compost without ABX	56	Lettuce	0	0	0	TRUE
Compost with ABX	56	Radish	0	0	0	TRUE
Compost with ABX	56	Lettuce	0	0	0	TRUE
Compost with ABX	56	Radish	0	0	0	TRUE
Compost with ABX	56	Lettuce	0	0	0	TRUE
Compost with ABX	56	Radish	0	0	0	TRUE
Compost with ABX	56	Lettuce	0	0	0	TRUE
Manure with ABX	56	Radish	0	0	0	TRUE

Manure with ABX	56	Lettuce	0	0	0	TRUE
Manure with ABX	56	Radish	0	0	0	TRUE
Manure with ABX	56	Lettuce	0	0	0	TRUE
Manure with ABX	56	Radish	0	0	0	TRUE
Manure with ABX	56	Lettuce	0	0	0	TRUE
No Amendment Control	56	None	0	0	0	TRUE
No Amendment Control	56	None	0	0	0	TRUE
No Amendment Control	56	None	0	0	0	TRUE
Fertilizer Control	56	Radish	0	0	0	TRUE
Fertilizer Control	56	Lettuce	0	0	0	TRUE
Fertilizer Control	56	Radish	0	0	0	TRUE
Fertilizer Control	56	Lettuce	0	0	0	TRUE
Fertilizer Control	56	Radish	0	0	0	TRUE
Fertilizer Control	56	Lettuce	0	0	0	TRUE
Compost without ABX	56	Radish	0	0	0	TRUE
Compost without ABX	56	Lettuce	0	0	0	TRUE
Compost without ABX	56	Radish	0	0	0	TRUE
Compost without ABX	56	Lettuce	0	0	0	TRUE
Compost without ABX	56	Radish	0	0	0	TRUE
Compost without ABX	56	Lettuce	0	0	0	TRUE
Compost with ABX	56	Radish	0	0	0	TRUE
Compost with ABX	56	Lettuce	0	0	0	TRUE
Compost with ABX	56	Radish	0	0	0	TRUE
Compost with ABX	56	Lettuce	0	0	0	TRUE
Compost with ABX	56	Radish	0	0	0	TRUE
Compost with ABX	56	Lettuce	0	0	0	TRUE
Manure with ABX	56	Radish	0	0	0	TRUE

Manure with ABX	56	Lettuce	0	0	0	TRUE
Manure with ABX	56	Radish	0	0	0	TRUE
Manure with ABX	56	Lettuce	0	0	0	TRUE
Manure with ABX	56	Radish	0	0	0	TRUE
Manure with ABX	56	Lettuce	0	0	0	TRUE
No Amendment Control	90	None	0	0	0	TRUE
No Amendment Control	90	None	0	0	0	TRUE
No Amendment Control	90	None	0	0	0	TRUE
Fertilizer Control	90	Radish	0	0	0	TRUE
Fertilizer Control	90	Lettuce	0	0	0	TRUE
Fertilizer Control	90	Radish	0	0	0	TRUE
Fertilizer Control	90	Lettuce	0	0	0	TRUE
Fertilizer Control	90	Radish	0	0	0	TRUE
Fertilizer Control	90	Lettuce	0	0	0	TRUE
Compost without ABX	90	Radish	0	0	0	TRUE
Compost without ABX	90	Lettuce	0	0	0	TRUE
Compost without ABX	90	Radish	0	0	0	TRUE
Compost without ABX	90	Lettuce	0	0	0	TRUE
Compost without ABX	90	Radish	0	0	0	TRUE
Compost without ABX	90	Lettuce	0	0	0	TRUE
Compost with ABX	90	Radish	0	0	0	TRUE
Compost with ABX	90	Lettuce	0	0	0	TRUE
Compost with ABX	90	Radish	0	0	0	TRUE
Compost with ABX	90	Lettuce	0	0	0	TRUE
Compost with ABX	90	Radish	0	0	0	TRUE
Compost with ABX	90	Lettuce	0	0	0	TRUE
Manure with ABX	90	Radish	0	0	0	TRUE

Manure with ABX	90	Lettuce	0	0	0	TRUE
Manure with ABX	90	Radish	0	0	0	TRUE
Manure with ABX	90	Lettuce	0	0	0	TRUE
Manure with ABX	90	Radish	0	0	0	TRUE
Manure with ABX	90	Lettuce	0	0	0	TRUE
No Amendment Control	90	None	0	0	0	TRUE
No Amendment Control	90	None	0	0	0	TRUE
No Amendment Control	90	None	0	0	0	TRUE
Fertilizer Control	90	Radish	0	0	0	TRUE
Fertilizer Control	90	Lettuce	0	0	0	TRUE
Fertilizer Control	90	Radish	0	0	0	TRUE
Fertilizer Control	90	Lettuce	0	0	0	TRUE
Fertilizer Control	90	Radish	0	0	0	TRUE
Fertilizer Control	90	Lettuce	0	0	0	TRUE
Compost without ABX	90	Radish	0	0	0	TRUE
Compost without ABX	90	Lettuce	0	0	0	TRUE
Compost without ABX	90	Radish	0	0	0	TRUE
Compost without ABX	90	Lettuce	0	0	0	TRUE
Compost without ABX	90	Radish	0	0	0	TRUE
Compost without ABX	90	Lettuce	0	0	0	TRUE
Compost with ABX	90	Radish	0	0	0	TRUE
Compost with ABX	90	Lettuce	0	0	0	TRUE
Compost with ABX	90	Radish	0	0	0	TRUE
Compost with ABX	90	Lettuce	0	0	0	TRUE
Compost with ABX	90	Radish	0	0	0	TRUE
Compost with ABX	90	Lettuce	0	0	0	TRUE
Manure with ABX	90	Radish	0	0	0	TRUE

Manure with ABX	90	Lettuce	0	0	0	TRUE
Manure with ABX	90	Radish	0	0	0	TRUE
Manure with ABX	90	Lettuce	0	0	0	TRUE
Manure with ABX	90	Radish	0	0	0	TRUE
Manure with ABX	90	Lettuce	0	0	0	TRUE
No Amendment Control	90	None	0	0	0	TRUE
No Amendment Control	90	None	0	0	0	TRUE
No Amendment Control	90	None	0	0	0	TRUE
Fertilizer Control	90	Radish	0	0	0	TRUE
Fertilizer Control	90	Lettuce	0	0	0	TRUE
Fertilizer Control	90	Radish	0	0	0	TRUE
Fertilizer Control	90	Lettuce	0	0	0	TRUE
Fertilizer Control	90	Radish	0	0	0	TRUE
Fertilizer Control	90	Lettuce	0	0	0	TRUE
Compost without ABX	90	Radish	0	0	0	TRUE
Compost without ABX	90	Lettuce	0	0	0	TRUE
Compost without ABX	90	Radish	0	0	0	TRUE
Compost without ABX	90	Lettuce	0	0	0	TRUE
Compost without ABX	90	Radish	0	0	0	TRUE
Compost without ABX	90	Lettuce	0	0	0	TRUE
Compost with ABX	90	Radish	0	0	0	TRUE
Compost with ABX	90	Lettuce	0	0	0	TRUE
Compost with ABX	90	Radish	0	0	0	TRUE
Compost with ABX	90	Lettuce	0	0	0	TRUE
Compost with ABX	90	Radish	0	0	0	TRUE
Compost with ABX	90	Lettuce	0	0	0	TRUE
Manure with ABX	90	Radish	0	0	0	TRUE

Manure with ABX	90	Lettuce	0	0	0	TRUE
Manure with ABX	90	Radish	0	0	0	TRUE
Manure with ABX	90	Lettuce	0	0	0	TRUE
Manure with ABX	90	Radish	0	0	0	TRUE
Manure with ABX	90	Lettuce	0	0	0	TRUE
No Amendment Control	120	None	0	0	0	TRUE
No Amendment Control	120	None	0	0	0	TRUE
No Amendment Control	120	None	0	0	0	TRUE
Fertilizer Control	120	Radish	0	0	0	TRUE
Fertilizer Control	120	Lettuce	0	0	0	TRUE
Fertilizer Control	120	Radish	0	0	0	TRUE
Fertilizer Control	120	Lettuce	0	0	0	TRUE
Fertilizer Control	120	Radish	0	0	0	TRUE
Fertilizer Control	120	Lettuce	0	0	0	TRUE
Compost without ABX	120	Radish	0	0	0	TRUE
Compost without ABX	120	Lettuce	0	0	0	TRUE
Compost without ABX	120	Radish	0	0	0	TRUE
Compost without ABX	120	Lettuce	0	0	0	TRUE
Compost without ABX	120	Radish	0	0	0	TRUE
Compost without ABX	120	Lettuce	0	0	0	TRUE
Compost with ABX	120	Radish	0	0	0	TRUE
Compost with ABX	120	Lettuce	0	0	0	TRUE
Compost with ABX	120	Radish	0	0	0	TRUE
Compost with ABX	120	Lettuce	0	0	0	TRUE
Compost with ABX	120	Radish	0	0	0	TRUE
Compost with ABX	120	Lettuce	0	0	0	TRUE
Manure with ABX	120	Radish	0	0	0	TRUE

Manure with ABX	120	Lettuce	0	0	0	TRUE
Manure with ABX	120	Radish	0	0	0	TRUE
Manure with ABX	120	Lettuce	0	0	0	TRUE
Manure with ABX	120	Radish	0	0	0	TRUE
Manure with ABX	120	Lettuce	0	0	0	TRUE
No Amendment Control	120	None	0	0	0	TRUE
No Amendment Control	120	None	0	0	0	TRUE
No Amendment Control	120	None	0	0	0	TRUE
Fertilizer Control	120	Radish	0	0	0	TRUE
Fertilizer Control	120	Lettuce	0	0	0	TRUE
Fertilizer Control	120	Radish	0	0	0	TRUE
Fertilizer Control	120	Lettuce	0	0	0	TRUE
Fertilizer Control	120	Radish	0	0	0	TRUE
Fertilizer Control	120	Lettuce	0	0	0	TRUE
Compost without ABX	120	Radish	0	0	0	TRUE
Compost without ABX	120	Lettuce	0	0	0	TRUE
Compost without ABX	120	Radish	0	0	0	TRUE
Compost without ABX	120	Lettuce	0	0	0	TRUE
Compost without ABX	120	Radish	0	0	0	TRUE
Compost without ABX	120	Lettuce	0	0	0	TRUE
Compost with ABX	120	Radish	0	0	0	TRUE
Compost with ABX	120	Lettuce	0	0	0	TRUE
Compost with ABX	120	Radish	0	0	0	TRUE
Compost with ABX	120	Lettuce	0	0	0	TRUE
Compost with ABX	120	Radish	0	0	0	TRUE
Compost with ABX	120	Lettuce	0	0	0	TRUE
Manure with ABX	120	Radish	0	0	0	TRUE

Manure with ABX	120	Lettuce	0	0	0	TRUE
Manure with ABX	120	Radish	0	0	0	TRUE
Manure with ABX	120	Lettuce	0	0	0	TRUE
Manure with ABX	120	Radish	0	0	0	TRUE
Manure with ABX	120	Lettuce	0	0	0	TRUE
No Amendment Control	120	None	0	0	0	TRUE
No Amendment Control	120	None	0	0	0	TRUE
No Amendment Control	120	None	0	0	0	TRUE
Fertilizer Control	120	Radish	0	0	0	TRUE
Fertilizer Control	120	Lettuce	0	0	0	TRUE
Fertilizer Control	120	Radish	0	0	0	TRUE
Fertilizer Control	120	Lettuce	0	0	0	TRUE
Fertilizer Control	120	Radish	0	0	0	TRUE
Fertilizer Control	120	Lettuce	0	0	0	TRUE
Compost without ABX	120	Radish	0	0	0	TRUE
Compost without ABX	120	Lettuce	0	0	0	TRUE
Compost without ABX	120	Radish	0	0	0	TRUE
Compost without ABX	120	Lettuce	0	0	0	TRUE
Compost without ABX	120	Radish	0	0	0	TRUE
Compost without ABX	120	Lettuce	0	0	0	TRUE
Compost with ABX	120	Radish	0	0	0	TRUE
Compost with ABX	120	Lettuce	0	0	0	TRUE
Compost with ABX	120	Radish	0	0	0	TRUE
Compost with ABX	120	Lettuce	0	0	0	TRUE
Compost with ABX	120	Radish	0	0	0	TRUE
Compost with ABX	120	Lettuce	0	0	0	TRUE
Manure with ABX	120	Radish	0	0	0	TRUE

Manure with ABX	120	Lettuce	0	0	0	TRUE
Manure with ABX	120	Radish	0	0	0	TRUE
Manure with ABX	120	Lettuce	0	0	0	TRUE
Manure with ABX	120	Radish	0	0	0	TRUE
Manure with ABX	120	Lettuce	0	0	0	TRUE

APPENDIX N. Raw Data: Colony Counts from Tetracycline MacConkey Agar Plates for entire study.

Table N.1. Table I.1. Colony counts, dilution, and CFU's for Day -1, 0, 7, 28, 42, 56, 90, and 120 tetracycline plates.

Treatment	Time	Vegetable	Colonies Counted	CFU E. coli/ g soil	log10 CFU E. coli/ g soil	Censored CFU
No Amendment Control	-1	None	0	0	0	TRUE
No Amendment Control	-1	None	0	0	0	TRUE
No Amendment Control	-1	None	0	0	0	TRUE
Fertilizer Control	-1	Radish	0	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	0	0	TRUE
Fertilizer Control	-1	Radish	0	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	0	0	TRUE
Fertilizer Control	-1	Radish	0	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	0	0	TRUE
Compost without ABX	-1	Radish	0	0	0	TRUE
Compost without ABX	-1	Lettuce	0	0	0	TRUE
Compost without ABX	-1	Radish	0	0	0	TRUE
Compost without ABX	-1	Lettuce	0	0	0	TRUE
Compost without ABX	-1	Radish	0	0	0	TRUE
Compost without ABX	-1	Lettuce	0	0	0	TRUE
Compost with ABX	-1	Radish	1	10	1	FALSE
Compost with ABX	-1	Lettuce	0	0	0	TRUE
Compost with ABX	-1	Radish	0	0	0	TRUE
Compost with ABX	-1	Lettuce	0	0	0	TRUE
Compost with ABX	-1	Radish	0	0	0	TRUE
Compost with ABX	-1	Lettuce	0	0	0	TRUE
Manure with ABX	-1	Radish	0	0	0	TRUE

Manure with ABX	-1	Lettuce	0	0	0	TRUE
Manure with ABX	-1	Radish	0	0	0	TRUE
Manure with ABX	-1	Lettuce	0	0	0	TRUE
Manure with ABX	-1	Radish	0	0	0	TRUE
Manure with ABX	-1	Lettuce	0	0	0	TRUE
No Amendment Control	-1	None	0	0	0	TRUE
No Amendment Control	-1	None	0	0	0	TRUE
No Amendment Control	-1	None	0	0	0	TRUE
Fertilizer Control	-1	Radish	0	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	0	0	TRUE
Fertilizer Control	-1	Radish	0	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	0	0	TRUE
Fertilizer Control	-1	Radish	0	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	0	0	TRUE
Compost without ABX	-1	Radish	0	0	0	TRUE
Compost without ABX	-1	Lettuce	0	0	0	TRUE
Compost without ABX	-1	Radish	0	0	0	TRUE
Compost without ABX	-1	Lettuce	0	0	0	TRUE
Compost without ABX	-1	Radish	0	0	0	TRUE
Compost without ABX	-1	Lettuce	0	0	0	TRUE
Compost with ABX	-1	Radish	0	0	0	TRUE
Compost with ABX	-1	Lettuce	0	0	0	TRUE
Compost with ABX	-1	Radish	0	0	0	TRUE
Compost with ABX	-1	Lettuce	0	0	0	TRUE
Compost with ABX	-1	Radish	0	0	0	TRUE
Compost with ABX	-1	Lettuce	0	0	0	TRUE
Manure with ABX	-1	Radish	0	0	0	TRUE

Manure with ABX	-1	Lettuce	0	0	0	TRUE
Manure with ABX	-1	Radish	0	0	0	TRUE
Manure with ABX	-1	Lettuce	0	0	0	TRUE
Manure with ABX	-1	Radish	0	0	0	TRUE
Manure with ABX	-1	Lettuce	0	0	0	TRUE
No Amendment Control	-1	None	0	0	0	TRUE
No Amendment Control	-1	None	0	0	0	TRUE
No Amendment Control	-1	None	0	0	0	TRUE
Fertilizer Control	-1	Radish	0	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	0	0	TRUE
Fertilizer Control	-1	Radish	0	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	0	0	TRUE
Fertilizer Control	-1	Radish	0	0	0	TRUE
Fertilizer Control	-1	Lettuce	0	0	0	TRUE
Compost without ABX	-1	Radish	0	0	0	TRUE
Compost without ABX	-1	Lettuce	0	0	0	TRUE
Compost without ABX	-1	Radish	0	0	0	TRUE
Compost without ABX	-1	Lettuce	0	0	0	TRUE
Compost without ABX	-1	Radish	0	0	0	TRUE
Compost without ABX	-1	Lettuce	0	0	0	TRUE
Compost with ABX	-1	Radish	0	0	0	TRUE
Compost with ABX	-1	Lettuce	0	0	0	TRUE
Compost with ABX	-1	Radish	0	0	0	TRUE
Compost with ABX	-1	Lettuce	0	0	0	TRUE
Compost with ABX	-1	Radish	0	0	0	TRUE
Compost with ABX	-1	Lettuce	0	0	0	TRUE
Manure with ABX	-1	Radish	0	0	0	TRUE

Manure with ABX	-1	Lettuce	0	0	0	TRUE
Manure with ABX	-1	Radish	0	0	0	TRUE
Manure with ABX	-1	Lettuce	0	0	0	TRUE
Manure with ABX	-1	Radish	0	0	0	TRUE
Manure with ABX	-1	Lettuce	0	0	0	TRUE
No Amendment Control	0	None	0	0	0	TRUE
No Amendment Control	0	None	0	0	0	TRUE
No Amendment Control	0	None	0	0	0	TRUE
Fertilizer Control	0	Radish	0	0	0	TRUE
Fertilizer Control	0	Lettuce	0	0	0	TRUE
Fertilizer Control	0	Radish	0	0	0	TRUE
Fertilizer Control	0	Lettuce	0	0	0	TRUE
Fertilizer Control	0	Radish	0	0	0	TRUE
Fertilizer Control	0	Lettuce	0	0	0	TRUE
Compost without ABX	0	Radish	0	0	0	TRUE
Compost without ABX	0	Lettuce	0	0	0	TRUE
Compost without ABX	0	Radish	0	0	0	TRUE
Compost without ABX	0	Lettuce	0	0	0	TRUE
Compost without ABX	0	Radish	0	0	0	TRUE
Compost without ABX	0	Lettuce	0	0	0	TRUE
Compost with ABX	0	Radish	0	0	0	TRUE
Compost with ABX	0	Lettuce	0	0	0	TRUE
Compost with ABX	0	Radish	0	0	0	TRUE
Compost with ABX	0	Lettuce	0	0	0	TRUE
Compost with ABX	0	Radish	0	0	0	TRUE
Compost with ABX	0	Lettuce	0	0	0	TRUE
Manure with ABX	0	Radish	0	0	0	TRUE

Manure with ABX	0	Lettuce	4	400	2.602059991	FALSE
Manure with ABX	0	Radish	0	0	0	TRUE
Manure with ABX	0	Lettuce	2	200	2.301029996	FALSE
Manure with ABX	0	Radish	80	80000	4.903089987	FALSE
Manure with ABX	0	Lettuce	20	2000	3.301029996	FALSE
No Amendment Control	0	None	0	0	0	TRUE
No Amendment Control	0	None	0	0	0	TRUE
No Amendment Control	0	None	0	0	0	TRUE
Fertilizer Control	0	Radish	0	0	0	TRUE
Fertilizer Control	0	Lettuce	0	0	0	TRUE
Fertilizer Control	0	Radish	0	0	0	TRUE
Fertilizer Control	0	Lettuce	0	0	0	TRUE
Fertilizer Control	0	Radish	0	0	0	TRUE
Fertilizer Control	0	Lettuce	0	0	0	TRUE
Compost without ABX	0	Radish	0	0	0	TRUE
Compost without ABX	0	Lettuce	2	200	2.301029996	FALSE
Compost without ABX	0	Radish	0	0	0	TRUE
Compost without ABX	0	Lettuce	0	0	0	TRUE
Compost without ABX	0	Radish	0	0	0	TRUE
Compost without ABX	0	Lettuce	0	0	0	TRUE
Compost with ABX	0	Radish	0	0	0	TRUE
Compost with ABX	0	Lettuce	0	0	0	TRUE
Compost with ABX	0	Radish	0	0	0	TRUE
Compost with ABX	0	Lettuce	0	0	0	TRUE
Compost with ABX	0	Radish	0	0	0	TRUE
Compost with ABX	0	Lettuce	0	0	0	TRUE
Manure with ABX	0	Radish	5	500	2.698970004	FALSE

Manure with ABX	0	Lettuce	21	2100	3.322219295	FALSE
Manure with ABX	0	Radish	0	0	0	TRUE
Manure with ABX	0	Lettuce	2	200	2.301029996	FALSE
Manure with ABX	0	Radish	47	47000	4.672097858	FALSE
Manure with ABX	0	Lettuce	12	1200	3.079181246	FALSE
No Amendment Control	0	None	0	0	0	TRUE
No Amendment Control	0	None	0	0	0	TRUE
No Amendment Control	0	None	0	0	0	TRUE
Fertilizer Control	0	Radish	0	0	0	TRUE
Fertilizer Control	0	Lettuce	0	0	0	TRUE
Fertilizer Control	0	Radish	0	0	0	TRUE
Fertilizer Control	0	Lettuce	0	0	0	TRUE
Fertilizer Control	0	Radish	0	0	0	TRUE
Fertilizer Control	0	Lettuce	0	0	0	TRUE
Compost without ABX	0	Radish	0	0	0	TRUE
Compost without ABX	0	Lettuce	0	0	0	TRUE
Compost without ABX	0	Radish	0	0	0	TRUE
Compost without ABX	0	Lettuce	0	0	0	TRUE
Compost without ABX	0	Radish	0	0	0	TRUE
Compost without ABX	0	Lettuce	0	0	0	TRUE
Compost with ABX	0	Radish	0	0	0	TRUE
Compost with ABX	0	Lettuce	0	0	0	TRUE
Compost with ABX	0	Radish	0	0	0	TRUE
Compost with ABX	0	Lettuce	0	0	0	TRUE
Compost with ABX	0	Radish	0	0	0	TRUE
Compost with ABX	0	Lettuce	0	0	0	TRUE
Manure with ABX	0	Radish	0	0	0	TRUE

Manure with ABX	0	Lettuce	7	700	2.84509804	FALSE
Manure with ABX	0	Radish	2	200	2.301029996	FALSE
Manure with ABX	0	Lettuce	0	0	0	TRUE
Manure with ABX	0	Radish	31	31000	4.491361694	FALSE
Manure with ABX	0	Lettuce	9	900	2.954242509	FALSE
No Amendment Control	7	None	0	0	0	TRUE
No Amendment Control	7	None	0	0	0	TRUE
No Amendment Control	7	None	0	0	0	TRUE
Fertilizer Control	7	Radish	0	0	0	TRUE
Fertilizer Control	7	Lettuce	0	0	0	TRUE
Fertilizer Control	7	Radish	0	0	0	TRUE
Fertilizer Control	7	Lettuce	0	0	0	TRUE
Fertilizer Control	7	Radish	0	0	0	TRUE
Fertilizer Control	7	Lettuce	0	0	0	TRUE
Compost without ABX	7	Radish	1	100	2	FALSE
Compost without ABX	7	Lettuce	0	0	0	TRUE
Compost without ABX	7	Radish	0	0	0	TRUE
Compost without ABX	7	Lettuce	0	0	0	TRUE
Compost without ABX	7	Radish	0	0	0	TRUE
Compost without ABX	7	Lettuce	0	0	0	TRUE
Compost with ABX	7	Radish	0	0	0	TRUE
Compost with ABX	7	Lettuce	0	0	0	TRUE
Compost with ABX	7	Radish	0	0	0	TRUE
Compost with ABX	7	Lettuce	0	0	0	TRUE
Compost with ABX	7	Radish	0	0	0	TRUE
Compost with ABX	7	Lettuce	0	0	0	TRUE
Manure with ABX	7	Radish	0	0	0	TRUE

Manure with ABX	7	Lettuce	0	0	0	TRUE
Manure with ABX	7	Radish	0	0	0	TRUE
Manure with ABX	7	Lettuce	0	0	0	TRUE
Manure with ABX	7	Radish	60	6000	3.77815125	FALSE
Manure with ABX	7	Lettuce	0	0	0	TRUE
No Amendment Control	7	None	0	0	0	TRUE
No Amendment Control	7	None	0	0	0	TRUE
No Amendment Control	7	None	0	0	0	TRUE
Fertilizer Control	7	Radish	0	0	0	TRUE
Fertilizer Control	7	Lettuce	0	0	0	TRUE
Fertilizer Control	7	Radish	0	0	0	TRUE
Fertilizer Control	7	Lettuce	0	0	0	TRUE
Fertilizer Control	7	Radish	0	0	0	TRUE
Fertilizer Control	7	Lettuce	0	0	0	TRUE
Compost without ABX	7	Radish	0	0	0	TRUE
Compost without ABX	7	Lettuce	0	0	0	TRUE
Compost without ABX	7	Radish	0	0	0	TRUE
Compost without ABX	7	Lettuce	0	0	0	TRUE
Compost without ABX	7	Radish	0	0	0	TRUE
Compost without ABX	7	Lettuce	0	0	0	TRUE
Compost with ABX	7	Radish	0	0	0	TRUE
Compost with ABX	7	Lettuce	1	100	2	FALSE
Compost with ABX	7	Radish	0	0	0	TRUE
Compost with ABX	7	Lettuce	0	0	0	TRUE
Compost with ABX	7	Radish	0	0	0	TRUE
Compost with ABX	7	Lettuce	0	0	0	TRUE
Manure with ABX	7	Radish	0	0	0	TRUE

Manure with ABX	7	Lettuce	0	0	0	TRUE
Manure with ABX	7	Radish	0	0	0	TRUE
Manure with ABX	7	Lettuce	0	0	0	TRUE
Manure with ABX	7	Radish	75	7500	3.875061263	FALSE
Manure with ABX	7	Lettuce	0	0	0	TRUE
No Amendment Control	7	None	0	0	0	TRUE
No Amendment Control	7	None	0	0	0	TRUE
No Amendment Control	7	None	0	0	0	TRUE
Fertilizer Control	7	Radish	0	0	0	TRUE
Fertilizer Control	7	Lettuce	0	0	0	TRUE
Fertilizer Control	7	Radish	0	0	0	TRUE
Fertilizer Control	7	Lettuce	0	0	0	TRUE
Fertilizer Control	7	Radish	0	0	0	TRUE
Fertilizer Control	7	Lettuce	0	0	0	TRUE
Compost without ABX	7	Radish	0	0	0	TRUE
Compost without ABX	7	Lettuce	0	0	0	TRUE
Compost without ABX	7	Radish	0	0	0	TRUE
Compost without ABX	7	Lettuce	0	0	0	TRUE
Compost without ABX	7	Radish	0	0	0	TRUE
Compost without ABX	7	Lettuce	0	0	0	TRUE
Compost with ABX	7	Radish	0	0	0	TRUE
Compost with ABX	7	Lettuce	0	0	0	TRUE
Compost with ABX	7	Radish	0	0	0	TRUE
Compost with ABX	7	Lettuce	0	0	0	TRUE
Compost with ABX	7	Radish	0	0	0	TRUE
Compost with ABX	7	Lettuce	0	0	0	TRUE
Manure with ABX	7	Radish	4	400	2.602059991	FALSE

Manure with ABX	7	Lettuce	0	0	0	TRUE
Manure with ABX	7	Radish	0	0	0	TRUE
Manure with ABX	7	Lettuce	0	0	0	TRUE
Manure with ABX	7	Radish	42	4200	3.62324929	FALSE
Manure with ABX	7	Lettuce	11	1100	3.041392685	FALSE
No Amendment Control	28	None	0	0	0	TRUE
No Amendment Control	28	None	0	0	0	TRUE
No Amendment Control	28	None	0	0	0	TRUE
Fertilizer Control	28	Radish	0	0	0	TRUE
Fertilizer Control	28	Lettuce	0	0	0	TRUE
Fertilizer Control	28	Radish	0	0	0	TRUE
Fertilizer Control	28	Lettuce	0	0	0	TRUE
Fertilizer Control	28	Radish	0	0	0	TRUE
Fertilizer Control	28	Lettuce	0	0	0	TRUE
Compost without ABX	28	Radish	0	0	0	TRUE
Compost without ABX	28	Lettuce	0	0	0	TRUE
Compost without ABX	28	Radish	0	0	0	TRUE
Compost without ABX	28	Lettuce	0	0	0	TRUE
Compost without ABX	28	Radish	0	0	0	TRUE
Compost without ABX	28	Lettuce	0	0	0	TRUE
Compost with ABX	28	Radish	0	0	0	TRUE
Compost with ABX	28	Lettuce	0	0	0	TRUE
Compost with ABX	28	Radish	0	0	0	TRUE
Compost with ABX	28	Lettuce	0	0	0	TRUE
Compost with ABX	28	Radish	0	0	0	TRUE
Compost with ABX	28	Lettuce	0	0	0	TRUE
Manure with ABX	28	Radish	0	0	0	TRUE

Manure with ABX	28	Lettuce	1	100	2	FALSE
Manure with ABX	28	Radish	0	0	0	TRUE
Manure with ABX	28	Lettuce	0	0	0	TRUE
Manure with ABX	28	Radish	0	0	0	TRUE
Manure with ABX	28	Lettuce	0	0	0	TRUE
No Amendment Control	28	None	0	0	0	TRUE
No Amendment Control	28	None	0	0	0	TRUE
No Amendment Control	28	None	0	0	0	TRUE
Fertilizer Control	28	Radish	0	0	0	TRUE
Fertilizer Control	28	Lettuce	0	0	0	TRUE
Fertilizer Control	28	Radish	0	0	0	TRUE
Fertilizer Control	28	Lettuce	0	0	0	TRUE
Fertilizer Control	28	Radish	0	0	0	TRUE
Fertilizer Control	28	Lettuce	0	0	0	TRUE
Compost without ABX	28	Radish	0	0	0	TRUE
Compost without ABX	28	Lettuce	0	0	0	TRUE
Compost without ABX	28	Radish	0	0	0	TRUE
Compost without ABX	28	Lettuce	0	0	0	TRUE
Compost without ABX	28	Radish	0	0	0	TRUE
Compost without ABX	28	Lettuce	0	0	0	TRUE
Compost with ABX	28	Radish	0	0	0	TRUE
Compost with ABX	28	Lettuce	0	0	0	TRUE
Compost with ABX	28	Radish	0	0	0	TRUE
Compost with ABX	28	Lettuce	0	0	0	TRUE
Compost with ABX	28	Radish	0	0	0	TRUE
Compost with ABX	28	Lettuce	0	0	0	TRUE
Manure with ABX	28	Radish	0	0	0	TRUE

Manure with ABX	28	Lettuce	0	0	0	TRUE
Manure with ABX	28	Radish	0	0	0	TRUE
Manure with ABX	28	Lettuce	0	0	0	TRUE
Manure with ABX	28	Radish	0	0	0	TRUE
Manure with ABX	28	Lettuce	0	0	0	TRUE
No Amendment Control	28	None	0	0	0	TRUE
No Amendment Control	28	None	0	0	0	TRUE
No Amendment Control	28	None	0	0	0	TRUE
Fertilizer Control	28	Radish	0	0	0	TRUE
Fertilizer Control	28	Lettuce	0	0	0	TRUE
Fertilizer Control	28	Radish	0	0	0	TRUE
Fertilizer Control	28	Lettuce	0	0	0	TRUE
Fertilizer Control	28	Radish	0	0	0	TRUE
Fertilizer Control	28	Lettuce	0	0	0	TRUE
Compost without ABX	28	Radish	0	0	0	TRUE
Compost without ABX	28	Lettuce	0	0	0	TRUE
Compost without ABX	28	Radish	0	0	0	TRUE
Compost without ABX	28	Lettuce	0	0	0	TRUE
Compost without ABX	28	Radish	0	0	0	TRUE
Compost without ABX	28	Lettuce	16	1600	3.204119983	FALSE
Compost with ABX	28	Radish	0	0	0	TRUE
Compost with ABX	28	Lettuce	0	0	0	TRUE
Compost with ABX	28	Radish	0	0	0	TRUE
Compost with ABX	28	Lettuce	0	0	0	TRUE
Compost with ABX	28	Radish	0	0	0	TRUE
Compost with ABX	28	Lettuce	0	0	0	TRUE
Manure with ABX	28	Radish	0	0	0	TRUE

Manure with ABX	28	Lettuce	0	0	0	TRUE
Manure with ABX	28	Radish	0	0	0	TRUE
Manure with ABX	28	Lettuce	0	0	0	TRUE
Manure with ABX	28	Radish	0	0	0	TRUE
Manure with ABX	28	Lettuce	0	0	0	TRUE
No Amendment Control	42	None	0	0	0	TRUE
No Amendment Control	42	None	0	0	0	TRUE
No Amendment Control	42	None	0	0	0	TRUE
Fertilizer Control	42	Radish	0	0	0	TRUE
Fertilizer Control	42	Lettuce	0	0	0	TRUE
Fertilizer Control	42	Radish	0	0	0	TRUE
Fertilizer Control	42	Lettuce	0	0	0	TRUE
Fertilizer Control	42	Radish	0	0	0	TRUE
Fertilizer Control	42	Lettuce	0	0	0	TRUE
Compost without ABX	42	Radish	0	0	0	TRUE
Compost without ABX	42	Lettuce	0	0	0	TRUE
Compost without ABX	42	Radish	0	0	0	TRUE
Compost without ABX	42	Lettuce	0	0	0	TRUE
Compost without ABX	42	Radish	0	0	0	TRUE
Compost without ABX	42	Lettuce	0	0	0	TRUE
Compost with ABX	42	Radish	0	0	0	TRUE
Compost with ABX	42	Lettuce	0	0	0	TRUE
Compost with ABX	42	Radish	0	0	0	TRUE
Compost with ABX	42	Lettuce	0	0	0	TRUE
Compost with ABX	42	Radish	0	0	0	TRUE
Compost with ABX	42	Lettuce	0	0	0	TRUE
Manure with ABX	42	Radish	0	0	0	TRUE

Manure with ABX	42	Lettuce	0	0	0	TRUE
Manure with ABX	42	Radish	0	0	0	TRUE
Manure with ABX	42	Lettuce	0	0	0	TRUE
Manure with ABX	42	Radish	0	0	0	TRUE
Manure with ABX	42	Lettuce	0	0	0	TRUE
No Amendment Control	42	None	0	0	0	TRUE
No Amendment Control	42	None	0	0	0	TRUE
No Amendment Control	42	None	0	0	0	TRUE
Fertilizer Control	42	Radish	0	0	0	TRUE
Fertilizer Control	42	Lettuce	0	0	0	TRUE
Fertilizer Control	42	Radish	0	0	0	TRUE
Fertilizer Control	42	Lettuce	0	0	0	TRUE
Fertilizer Control	42	Radish	0	0	0	TRUE
Fertilizer Control	42	Lettuce	0	0	0	TRUE
Compost without ABX	42	Radish	0	0	0	TRUE
Compost without ABX	42	Lettuce	0	0	0	TRUE
Compost without ABX	42	Radish	0	0	0	TRUE
Compost without ABX	42	Lettuce	0	0	0	TRUE
Compost without ABX	42	Radish	0	0	0	TRUE
Compost without ABX	42	Lettuce	0	0	0	TRUE
Compost with ABX	42	Radish	0	0	0	TRUE
Compost with ABX	42	Lettuce	0	0	0	TRUE
Compost with ABX	42	Radish	0	0	0	TRUE
Compost with ABX	42	Lettuce	0	0	0	TRUE
Compost with ABX	42	Radish	0	0	0	TRUE
Compost with ABX	42	Lettuce	0	0	0	TRUE
Manure with ABX	42	Radish	0	0	0	TRUE

Manure with ABX	42	Lettuce	0	0	0	TRUE
Manure with ABX	42	Radish	0	0	0	TRUE
Manure with ABX	42	Lettuce	0	0	0	TRUE
Manure with ABX	42	Radish	0	0	0	TRUE
Manure with ABX	42	Lettuce	0	0	0	TRUE
No Amendment Control	42	None	0	0	0	TRUE
No Amendment Control	42	None	0	0	0	TRUE
No Amendment Control	42	None	0	0	0	TRUE
Fertilizer Control	42	Radish	0	0	0	TRUE
Fertilizer Control	42	Lettuce	0	0	0	TRUE
Fertilizer Control	42	Radish	0	0	0	TRUE
Fertilizer Control	42	Lettuce	0	0	0	TRUE
Fertilizer Control	42	Radish	0	0	0	TRUE
Fertilizer Control	42	Lettuce	0	0	0	TRUE
Compost without ABX	42	Radish	0	0	0	TRUE
Compost without ABX	42	Lettuce	0	0	0	TRUE
Compost without ABX	42	Radish	0	0	0	TRUE
Compost without ABX	42	Lettuce	0	0	0	TRUE
Compost without ABX	42	Radish	0	0	0	TRUE
Compost without ABX	42	Lettuce	0	0	0	TRUE
Compost with ABX	42	Radish	0	0	0	TRUE
Compost with ABX	42	Lettuce	0	0	0	TRUE
Compost with ABX	42	Radish	0	0	0	TRUE
Compost with ABX	42	Lettuce	0	0	0	TRUE
Compost with ABX	42	Radish	0	0	0	TRUE
Compost with ABX	42	Lettuce	0	0	0	TRUE
Manure with ABX	42	Radish	0	0	0	TRUE

Manure with ABX	42	Lettuce	0	0	0	TRUE
Manure with ABX	42	Radish	0	0	0	TRUE
Manure with ABX	42	Lettuce	0	0	0	TRUE
Manure with ABX	42	Radish	0	0	0	TRUE
Manure with ABX	42	Lettuce	0	0	0	TRUE
No Amendment Control	56	None	0	0	0	TRUE
No Amendment Control	56	None	0	0	0	TRUE
No Amendment Control	56	None	0	0	0	TRUE
Fertilizer Control	56	Radish	0	0	0	TRUE
Fertilizer Control	56	Lettuce	0	0	0	TRUE
Fertilizer Control	56	Radish	0	0	0	TRUE
Fertilizer Control	56	Lettuce	0	0	0	TRUE
Fertilizer Control	56	Radish	0	0	0	TRUE
Fertilizer Control	56	Lettuce	0	0	0	TRUE
Compost without ABX	56	Radish	0	0	0	TRUE
Compost without ABX	56	Lettuce	0	0	0	TRUE
Compost without ABX	56	Radish	0	0	0	TRUE
Compost without ABX	56	Lettuce	0	0	0	TRUE
Compost without ABX	56	Radish	0	0	0	TRUE
Compost without ABX	56	Lettuce	0	0	0	TRUE
Compost with ABX	56	Radish	0	0	0	TRUE
Compost with ABX	56	Lettuce	0	0	0	TRUE
Compost with ABX	56	Radish	0	0	0	TRUE
Compost with ABX	56	Lettuce	0	0	0	TRUE
Compost with ABX	56	Radish	0	0	0	TRUE
Compost with ABX	56	Lettuce	0	0	0	TRUE
Manure with ABX	56	Radish	0	0	0	TRUE

Manure with ABX	56	Lettuce	0	0	0	TRUE
Manure with ABX	56	Radish	0	0	0	TRUE
Manure with ABX	56	Lettuce	0	0	0	TRUE
Manure with ABX	56	Radish	0	0	0	TRUE
Manure with ABX	56	Lettuce	0	0	0	TRUE
No Amendment Control	56	None	0	0	0	TRUE
No Amendment Control	56	None	0	0	0	TRUE
No Amendment Control	56	None	0	0	0	TRUE
Fertilizer Control	56	Radish	0	0	0	TRUE
Fertilizer Control	56	Lettuce	0	0	0	TRUE
Fertilizer Control	56	Radish	0	0	0	TRUE
Fertilizer Control	56	Lettuce	0	0	0	TRUE
Fertilizer Control	56	Radish	0	0	0	TRUE
Fertilizer Control	56	Lettuce	0	0	0	TRUE
Compost without ABX	56	Radish	0	0	0	TRUE
Compost without ABX	56	Lettuce	0	0	0	TRUE
Compost without ABX	56	Radish	0	0	0	TRUE
Compost without ABX	56	Lettuce	0	0	0	TRUE
Compost without ABX	56	Radish	0	0	0	TRUE
Compost without ABX	56	Lettuce	0	0	0	TRUE
Compost with ABX	56	Radish	0	0	0	TRUE
Compost with ABX	56	Lettuce	0	0	0	TRUE
Compost with ABX	56	Radish	0	0	0	TRUE
Compost with ABX	56	Lettuce	0	0	0	TRUE
Compost with ABX	56	Radish	0	0	0	TRUE
Compost with ABX	56	Lettuce	0	0	0	TRUE
Manure with ABX	56	Radish	0	0	0	TRUE

Manure with ABX	56	Lettuce	0	0	0	TRUE
Manure with ABX	56	Radish	0	0	0	TRUE
Manure with ABX	56	Lettuce	0	0	0	TRUE
Manure with ABX	56	Radish	0	0	0	TRUE
Manure with ABX	56	Lettuce	0	0	0	TRUE
No Amendment Control	56	None	0	0	0	TRUE
No Amendment Control	56	None	0	0	0	TRUE
No Amendment Control	56	None	0	0	0	TRUE
Fertilizer Control	56	Radish	0	0	0	TRUE
Fertilizer Control	56	Lettuce	0	0	0	TRUE
Fertilizer Control	56	Radish	0	0	0	TRUE
Fertilizer Control	56	Lettuce	0	0	0	TRUE
Fertilizer Control	56	Radish	0	0	0	TRUE
Fertilizer Control	56	Lettuce	0	0	0	TRUE
Compost without ABX	56	Radish	0	0	0	TRUE
Compost without ABX	56	Lettuce	0	0	0	TRUE
Compost without ABX	56	Radish	0	0	0	TRUE
Compost without ABX	56	Lettuce	0	0	0	TRUE
Compost without ABX	56	Radish	0	0	0	TRUE
Compost without ABX	56	Lettuce	0	0	0	TRUE
Compost with ABX	56	Radish	0	0	0	TRUE
Compost with ABX	56	Lettuce	0	0	0	TRUE
Compost with ABX	56	Radish	0	0	0	TRUE
Compost with ABX	56	Lettuce	0	0	0	TRUE
Compost with ABX	56	Radish	0	0	0	TRUE
Compost with ABX	56	Lettuce	0	0	0	TRUE
Manure with ABX	56	Radish	0	0	0	TRUE

Manure with ABX	56	Lettuce	0	0	0	TRUE
Manure with ABX	56	Radish	0	0	0	TRUE
Manure with ABX	56	Lettuce	0	0	0	TRUE
Manure with ABX	56	Radish	0	0	0	TRUE
Manure with ABX	56	Lettuce	0	0	0	TRUE
No Amendment Control	90	None	0	0	0	TRUE
No Amendment Control	90	None	0	0	0	TRUE
No Amendment Control	90	None	0	0	0	TRUE
Fertilizer Control	90	Radish	0	0	0	TRUE
Fertilizer Control	90	Lettuce	0	0	0	TRUE
Fertilizer Control	90	Radish	0	0	0	TRUE
Fertilizer Control	90	Lettuce	0	0	0	TRUE
Fertilizer Control	90	Radish	0	0	0	TRUE
Fertilizer Control	90	Lettuce	0	0	0	TRUE
Compost without ABX	90	Radish	0	0	0	TRUE
Compost without ABX	90	Lettuce	0	0	0	TRUE
Compost without ABX	90	Radish	0	0	0	TRUE
Compost without ABX	90	Lettuce	0	0	0	TRUE
Compost without ABX	90	Radish	0	0	0	TRUE
Compost without ABX	90	Lettuce	0	0	0	TRUE
Compost with ABX	90	Radish	0	0	0	TRUE
Compost with ABX	90	Lettuce	0	0	0	TRUE
Compost with ABX	90	Radish	0	0	0	TRUE
Compost with ABX	90	Lettuce	0	0	0	TRUE
Compost with ABX	90	Radish	0	0	0	TRUE
Compost with ABX	90	Lettuce	0	0	0	TRUE
Manure with ABX	90	Radish	0	0	0	TRUE

Manure with ABX	90	Lettuce	0	0	0	TRUE
Manure with ABX	90	Radish	0	0	0	TRUE
Manure with ABX	90	Lettuce	0	0	0	TRUE
Manure with ABX	90	Radish	0	0	0	TRUE
Manure with ABX	90	Lettuce	0	0	0	TRUE
No Amendment Control	90	None	0	0	0	TRUE
No Amendment Control	90	None	0	0	0	TRUE
No Amendment Control	90	None	0	0	0	TRUE
Fertilizer Control	90	Radish	0	0	0	TRUE
Fertilizer Control	90	Lettuce	0	0	0	TRUE
Fertilizer Control	90	Radish	0	0	0	TRUE
Fertilizer Control	90	Lettuce	0	0	0	TRUE
Fertilizer Control	90	Radish	0	0	0	TRUE
Fertilizer Control	90	Lettuce	0	0	0	TRUE
Compost without ABX	90	Radish	0	0	0	TRUE
Compost without ABX	90	Lettuce	0	0	0	TRUE
Compost without ABX	90	Radish	0	0	0	TRUE
Compost without ABX	90	Lettuce	0	0	0	TRUE
Compost without ABX	90	Radish	0	0	0	TRUE
Compost without ABX	90	Lettuce	0	0	0	TRUE
Compost with ABX	90	Radish	0	0	0	TRUE
Compost with ABX	90	Lettuce	0	0	0	TRUE
Compost with ABX	90	Radish	0	0	0	TRUE
Compost with ABX	90	Lettuce	0	0	0	TRUE
Compost with ABX	90	Radish	0	0	0	TRUE
Compost with ABX	90	Lettuce	0	0	0	TRUE
Manure with ABX	90	Radish	0	0	0	TRUE

Manure with ABX	90	Lettuce	0	0	0	TRUE
Manure with ABX	90	Radish	0	0	0	TRUE
Manure with ABX	90	Lettuce	0	0	0	TRUE
Manure with ABX	90	Radish	0	0	0	TRUE
Manure with ABX	90	Lettuce	0	0	0	TRUE
No Amendment Control	90	None	0	0	0	TRUE
No Amendment Control	90	None	0	0	0	TRUE
No Amendment Control	90	None	0	0	0	TRUE
Fertilizer Control	90	Radish	0	0	0	TRUE
Fertilizer Control	90	Lettuce	0	0	0	TRUE
Fertilizer Control	90	Radish	0	0	0	TRUE
Fertilizer Control	90	Lettuce	0	0	0	TRUE
Fertilizer Control	90	Radish	0	0	0	TRUE
Fertilizer Control	90	Lettuce	0	0	0	TRUE
Compost without ABX	90	Radish	0	0	0	TRUE
Compost without ABX	90	Lettuce	0	0	0	TRUE
Compost without ABX	90	Radish	0	0	0	TRUE
Compost without ABX	90	Lettuce	0	0	0	TRUE
Compost without ABX	90	Radish	0	0	0	TRUE
Compost without ABX	90	Lettuce	0	0	0	TRUE
Compost with ABX	90	Radish	0	0	0	TRUE
Compost with ABX	90	Lettuce	0	0	0	TRUE
Compost with ABX	90	Radish	0	0	0	TRUE
Compost with ABX	90	Lettuce	0	0	0	TRUE
Compost with ABX	90	Radish	0	0	0	TRUE
Compost with ABX	90	Lettuce	0	0	0	TRUE
Manure with ABX	90	Radish	0	0	0	TRUE

Manure with ABX	90	Lettuce	0	0	0	TRUE
Manure with ABX	90	Radish	0	0	0	TRUE
Manure with ABX	90	Lettuce	1	100	2	FALSE
Manure with ABX	90	Radish	0	0	0	TRUE
Manure with ABX	90	Lettuce	0	0	0	TRUE
No Amendment Control	120	None	0	0	0	TRUE
No Amendment Control	120	None	0	0	0	TRUE
No Amendment Control	120	None	0	0	0	TRUE
Fertilizer Control	120	Radish	0	0	0	TRUE
Fertilizer Control	120	Lettuce	0	0	0	TRUE
Fertilizer Control	120	Radish	0	0	0	TRUE
Fertilizer Control	120	Lettuce	0	0	0	TRUE
Fertilizer Control	120	Radish	0	0	0	TRUE
Fertilizer Control	120	Lettuce	0	0	0	TRUE
Compost without ABX	120	Radish	0	0	0	TRUE
Compost without ABX	120	Lettuce	0	0	0	TRUE
Compost without ABX	120	Radish	0	0	0	TRUE
Compost without ABX	120	Lettuce	0	0	0	TRUE
Compost without ABX	120	Radish	0	0	0	TRUE
Compost without ABX	120	Lettuce	0	0	0	TRUE
Compost with ABX	120	Radish	0	0	0	TRUE
Compost with ABX	120	Lettuce	0	0	0	TRUE
Compost with ABX	120	Radish	0	0	0	TRUE
Compost with ABX	120	Lettuce	0	0	0	TRUE
Compost with ABX	120	Radish	0	0	0	TRUE
Compost with ABX	120	Lettuce	0	0	0	TRUE
Manure with ABX	120	Radish	0	0	0	TRUE

Manure with ABX	120	Lettuce	0	0	0	TRUE
Manure with ABX	120	Radish	0	0	0	TRUE
Manure with ABX	120	Lettuce	0	0	0	TRUE
Manure with ABX	120	Radish	0	0	0	TRUE
Manure with ABX	120	Lettuce	0	0	0	TRUE
No Amendment Control	120	None	0	0	0	TRUE
No Amendment Control	120	None	0	0	0	TRUE
No Amendment Control	120	None	0	0	0	TRUE
Fertilizer Control	120	Radish	0	0	0	TRUE
Fertilizer Control	120	Lettuce	0	0	0	TRUE
Fertilizer Control	120	Radish	0	0	0	TRUE
Fertilizer Control	120	Lettuce	0	0	0	TRUE
Fertilizer Control	120	Radish	0	0	0	TRUE
Fertilizer Control	120	Lettuce	0	0	0	TRUE
Compost without ABX	120	Radish	0	0	0	TRUE
Compost without ABX	120	Lettuce	0	0	0	TRUE
Compost without ABX	120	Radish	0	0	0	TRUE
Compost without ABX	120	Lettuce	0	0	0	TRUE
Compost without ABX	120	Radish	0	0	0	TRUE
Compost without ABX	120	Lettuce	0	0	0	TRUE
Compost with ABX	120	Radish	0	0	0	TRUE
Compost with ABX	120	Lettuce	0	0	0	TRUE
Compost with ABX	120	Radish	0	0	0	TRUE
Compost with ABX	120	Lettuce	0	0	0	TRUE
Compost with ABX	120	Radish	0	0	0	TRUE
Compost with ABX	120	Lettuce	0	0	0	TRUE
Manure with ABX	120	Radish	0	0	0	TRUE

Manure with ABX	120	Lettuce	0	0	0	TRUE
Manure with ABX	120	Radish	0	0	0	TRUE
Manure with ABX	120	Lettuce	0	0	0	TRUE
Manure with ABX	120	Radish	0	0	0	TRUE
Manure with ABX	120	Lettuce	0	0	0	TRUE
No Amendment Control	120	None	0	0	0	TRUE
No Amendment Control	120	None	0	0	0	TRUE
No Amendment Control	120	None	0	0	0	TRUE
Fertilizer Control	120	Radish	0	0	0	TRUE
Fertilizer Control	120	Lettuce	0	0	0	TRUE
Fertilizer Control	120	Radish	0	0	0	TRUE
Fertilizer Control	120	Lettuce	0	0	0	TRUE
Fertilizer Control	120	Radish	0	0	0	TRUE
Fertilizer Control	120	Lettuce	0	0	0	TRUE
Compost without ABX	120	Radish	0	0	0	TRUE
Compost without ABX	120	Lettuce	0	0	0	TRUE
Compost without ABX	120	Radish	0	0	0	TRUE
Compost without ABX	120	Lettuce	0	0	0	TRUE
Compost without ABX	120	Radish	0	0	0	TRUE
Compost without ABX	120	Lettuce	0	0	0	TRUE
Compost with ABX	120	Radish	0	0	0	TRUE
Compost with ABX	120	Lettuce	0	0	0	TRUE
Compost with ABX	120	Radish	0	0	0	TRUE
Compost with ABX	120	Lettuce	0	0	0	TRUE
Compost with ABX	120	Radish	0	0	0	TRUE
Compost with ABX	120	Lettuce	0	0	0	TRUE
Manure with ABX	120	Radish	0	0	0	TRUE

Manure with ABX	120	Lettuce	0	0	0	TRUE
Manure with ABX	120	Radish	0	0	0	TRUE
Manure with ABX	120	Lettuce	0	0	0	TRUE
Manure with ABX	120	Radish	0	0	0	TRUE
Manure with ABX	120	Lettuce	0	0	0	TRUE