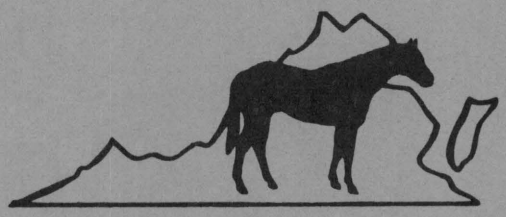
THE PROCEEDINGS
OF THE
UPDATE SEMINAR



March 24, 1979
Ingleside Resort
Staunton, Va.

Sponsored By

THE VIRGINIA COOPERATIVE EXTENSION SERVICE

In Cooperation With The

VIRGINIA HORSE COUNCIL,
Virginia Tech Animal Science Department,
and The Horse Industry

Prepared By

Dr. Arden N. Huff, Seminar Coordinator
Extension Specialist, Animal Science
VPI&SU
Blacksburg, Virginia 24061

TABLE OF CONTENTS

	Page
PASTURES AND HAYS FOR HORSES..... (Dr. H. E. White, VPI&SU, Blacksburg, VA)	1
PREVENTATIVE MEDICINE UPDATE..... (Dr. T. L. Bibb, VPI&SU, Blacksburg, VA)	5
CURRENT TOPICS IN EQUINE REPRODUCTION RESEARCH..... (Dr. T. N. Meacham, VPI&SU, Blacksburg, VA)	13
EQUINE NUTRITION RESEARCH REVIEW..... (Dr. J. P. Fontenot and V. A. Bowman, VPI&SU, Blacksburg, VA)	17
VAULTING..... (Mrs. Barbara Baird, Aldie, VA)	27
EQUESTRIAN THERAPY FOR SPECIAL RIDERS..... (Mrs. Barbara Baird, Aldie, VA)	30
STALLION AND MARE MANAGEMENT..... (Dr. M. D. Ingsbury, D.V.M., Ashland, VA)	33
EXTENSION HORSE PROGRAM..... (Dr. A. N. Huff, VPI&SU, Blacksburg, VA)	35
HORSE BOWL..... (Dr. A. N. Huff, VPI&SU, Blacksburg, VA)	38
VIRGINIA HORSE CENSUS..... (Dr. A. N. Huff, VPI&SU, Blacksburg, VA)	51

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, and September 30, 1977, in cooperation with the U. S. Department of Agriculture. W. R. Van Dresser, Dean, Extension Division, Cooperative Extension Service, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061; M. C. Harding, Sr., Administrator, 1890 Extension Program, Virginia State College, Petersburg, Virginia 23803.

PASTURES AND HAYS FOR HORSES

by
Dr. Harlan E. White, Extension Specialist, Forages
VPI&SU, Blacksburg, Virginia

The horse is, by nature, a grazing animal. Long before man decided to feed it hay and grain the horse depended on grazing the grasses and legumes provided by nature.

Too often, horse owners do not take advantage of pastures to provide high quality, low cost feed for their horses. While harvesting the pasture plants by grazing the horse is eliminating the need for expensive, energy consuming harvesting and storing equipment. At the same time it is getting exercise and fresh air, while providing its owner with pleasure just by seeing it out on green, lush pastures.

Nutritionally, well managed pastures will maintain mature horses with little or no grain. Young animals, those doing medium to heavy work, or those being prepared for shows and contests need grain and hay along with pasture.

High quality pastures are not produced accidentially. They are the result of good management practices. It is distressing to see fine horses behind well-kept fences grazing on weedy, thin pastures due to lack of proper fertilization, grazing management, and other management needed to develop and maintain productive pasture plants.

Making the assumption that a reasonably strong pasture sod is present, there are several management practices which need to be followed if that pasture is to be productive.

Fertilization is a "must" for pastures. How much and how often depends primarily on the nutrient status of the soil, intensity of grazing, whether or not hay is harvested from the pasture, and the type of plants in the pasture.

Taking a series of representative soil samples from the pasture in question is the first step in determining the amount of fertilizer and/or lime needed. The Extension Agent in each county has supplies and directions for this procedure. The state universities (Virginia Tech) maintain soil testing labs and there are a number of commercial labs available.

The results from these soil tests will indicate the amounts of lime, nitrogen, phosphate, and potassium needed. The soil pH (acidity) should be 6.0 to 6.4 in pastures. For example, if the soil test indicates the soil pH in the pasture is 5.7, this is too acid for grasses, and especially legumes, to grow well. Therefore, about two tons of ground agricultural limestone should be applied per acre.

The phosphate and potash levels in the soil should be maintained at not less than a medium level as determined by soil test. As a very general "rule of thumb", this will require an application of 50 to 70 lbs. of each per acre each year. This fertilizer can be applied at any time of the year, but the best time is from October to March.

Nitrogen fertilization of pastures will stimulate the grasses to make rapid growth and will give them a dark green, vigorous appearance. However, nitrogen application will also result in the clover plants being crowded out because of

the rapid growth of the grasses. Since the clover plants provide nitrogen for the grasses and improve the nutritional value of the pastures, it is usually desirable to maintain clover in the pasture. Thus, it is generally best not to fertilize pastures with nitrogen if at least 30% of the pasture growth is clover plants. If nitrogen is applied, normally the rate is 50 to 60 lbs. per acre in early spring and/or fall.

Grazing Management of pastures is important because it determines the degree and frequency of defoliation of the plants. This, in turn, affects the vigor, productivity, and quality of the plants. Horses are, by nature, spot grazers. They select certain areas in a pasture and keep it grazed down because the short plants (below 2 inches) are young and tender compared to older ones. This presents a problem to the manager because plants in other parts of the pasture which are not grazed closely by the horses become tall, low in quality, and crowded by weeds.

Overgrazing occurs when horses are permitted to continue to graze a pasture even after the plants are eaten down to the ground. This severely weakens the plants, reduces the growth that they can make, and in extreme cases will result in loss of stand. Parasite infestation of the horse is also generally more serious if pastures are kept extremely closely grazed. To prevent overgrazing, the manager must remove horses from closely grazed pastures and allow the plants to recover to a height of 4-6 inches before grazing is resumed.

Undergrazing is also a problem in many horse pastures, particularly if land is not a limiting factor. Often, no more than 1 horse is grazed for every 1 or 2 acres of pasture, which means that more grazing is produced than can be eaten. Undergrazed plants become tall, stemmy, low in quality, and crowded by weeds. The desirable clover plants find it difficult to survive in the tall growth. Periodic mowing (at least twice per season) helps to keep undergrazed pastures in good condition. Permitting cattle to graze with the horses or following them also helps to utilize the excess growth.

Manure Distribution also contributes to undergrazing since horses usually refuse to graze around manure piles. Using a chain drag or similar implement to spread the manure helps to correct this situation. This operation also will help to control parasites and will make the fertilizer value of the manure more uniformly available to the pasture.

Weed Infestation in pastures may become a problem. These undesirable plants lower the quality of the pasture and rob the desirable plants of necessary light and moisture. Weed invasion is usually a result of poor fertilization and/or grazing management. The use of herbicides such as 2,4-D are effective in controlling many of the broad-leaved weeds if it is applied when they are small. However, this also will kill the clover in the pastures. Proper fertilization, grazing management, and clipping before weeds produce seed are the best practices for controlling weeds.

Overseeding may be used to introduce new plants into the pasture sod with only a minimum of soil and plant disturbance. This can be best done to pastures in late February or early March when they are grazed very short. Clover seed can be simply broadcast on the surface during this time using a grain drill, a sod seeder, or disking lightly and then seeding.

HAY MANAGEMENT

Many of the same plants used for grazing can also be harvested, dried, and fed as hay. Plants such as orchardgrass, tall fescue, timothy, and red clover are used for both hay and pasture. Often the spring growth is harvested for hay and the regrowth grazed, especially in dry seasons when summer growth is limited. Alfalfa is not usually used for pasture, but is an excellent hay plant.

Plants harvested for hay generally need to be fertilized more heavily than those used for pasture. Very few nutrients are removed from the field by a grazing animal, but when the plant is harvested and removed as hay, many more nutrients leave the field. The only way to develop a sound fertilizer program is to rely on soil sampling and use the results as guidelines for fertilization.

Applications of phosphate and potash fertilizers can be made any time of the year on hay fields, but the period from October to March is best. If nitrogen fertilizer is being applied to grass fields such as timothy or orchardgrass which have no legumes present, a split application works well. For example 70 to 80 lbs. of nitrogen could be applied along with the fertilizer in March and an additional 70 to 80 lbs. of nitrogen per acre may be applied after the first cutting of hay is harvested to increase the yields of second and third cuttings.

As everyone knows who has attempted to produce or buy hay, high quality is often elusive and difficult to obtain. There are so many variables involved in producing hay that it is not surprising that such a wide range in quality exists. Understanding the factors involved in producing hay and knowing how to evaluate it will help you to provide high quality horse hay. The following are several general production factors affecting hay quality.

Species of Plants Cured for Hay - Legume hay such as alfalfa is generally higher in protein and minerals than grass hay. Red clover is another legume commonly used for hay but is often dustier than alfalfa and lacks alfalfa's green color. Grasses such as orchardgrass and timothy also make high quality hay and are often grown in a mixture with legumes. Most of the commonly grown domestic leafy grasses and legumes make high quality hay. Weeds, or undesirable plants, lower hay quality by adding woody material low in acceptability and digestibility, as well as contributing bad tastes or odors.

Growing Conditions - Hay grown during a drought may be stunted and less leafy than that grown with adequate moisture. Excessive moisture, on the other hand, often produces diseases which attack the leaves and may reduce leafiness. Plants grown under adequate fertility have a higher nutrient content and are more leafy and lower in fiber than those grown under low fertility.

Stage of Plant Growth at the Time of Harvest - As grasses and legumes advance from the vegetative to the reproductive stage, they become progressively lower in protein content, digestibility, and acceptability to livestock. This is the direct result of increased stemminess and fewer leaves, resulting in a higher fiber content. Legumes should generally be harvested when beginning to show a few flowers. Grasses should be harvested in spring when seed heads are beginning to appear.

Curing Conditions - If the hay is allowed to dry or "cure" in the field, rains and sunlight often reduce quality. Rains beat leaves from the legumes, leach nutrients from the leaves, and pack down mowed material to prevent proper drying. The crop thus soaked often begins to deteriorate before drying occurs. The sun further bleaches the leaves, resulting in losses of Vitamin A and in the "bleached" appearance of such material. Hay stored before being properly

dried will usually develop a musty, moldy odor. The molds present may be toxic to animals.

Harvesting Procedures - Hay allowed to completely dry in the field before raking into windrows for baling loses many brittle leaves in the raking process. Ideally, the stems should be crushed or "conditioned" at the time of mowing for more rapid drying and left in the windrow for drying. This avoids the necessity for raking which often shatters many leaves and mixes dust and dirt with the hay.

PREVENTATIVE MEDICINE UPDATE

Thomas L. Bibb, D.V.M., M.S.
Associate Professor of Veterinary Science
VPI & SU
Blacksburg, Virginia

In the past few years there has been an increasing interest shown by livestock producers in herd health programs. There has probably been more emphasis in the food producing species than there has in the pet animal groups. As far as horses are concerned the major breeding establishments have always had very extensive health programs, even though they may not have labeled them as such. Any health program, no matter what species, must be centered around preventive medicine. No matter what phase of the horse business you are in, whether it be breeding, sales, showing, or pleasure, the prevention of injuries or disease should be the primary purpose of any health program you have.

The horse has the largest heart size in relation to body weight of any of the animal species and is known as the "athlete" of the animal kingdom. In spite of their physical capabilities and stamina, horses are susceptible to many diseases and parasites just like man and other animals. They are also subject to injury, stress and all other ailments associated with animals.

Maintaining the health of the horse is essential to his optimum performance and physical well being. It also reduced the danger of the spread of diseases to other animals and in some cases to man.

It has been repeatedly demonstrated that the most effective and economical approach to the control of diseases and parasites is prevention. There are three fundamental principles that underlie preventive medicine.

1. Prevent animals from being exposed
2. Keep the resistance of the animals high
3. Induce immunity wherever available

Prevent Exposure

1. Cleanliness and sanitation are essential to all disease and parasite prevention.
2. Quarantine all newly purchased animals 30-60 days before adding to any others. Release from quarantine only after veterinarian is satisfied diseases and parasites are not present.
3. Keep visitors out of stalls and paddocks. Make them use rubber footwear and wash in and out using soap and water as well as disinfectant.
4. Use utensils and equipment on your own horses only. Do not borrow or lend waterers, grooming equipment or barn equipment.

5. Keep horses away from public feeding and watering places.

6. House yearlings and weanlings separate from pregnant mares.

7. Do not overstock pastures.

8. Keep horses from wet and marshy areas.

9. Avoid contact with visibly sick horses either directly or indirectly.

10. As soon as symptoms are observed or suspected in a horse, separate him from other horses.

11. Avoid injury.

Keep Resistance High

1. Keep well fed. Do not over -- or underfeed --
   a. Avoid contamination of feed.
   b. Feed from bunkers or racks and not on ground.

2. Maintain surroundings and environment properly
   a. Stalls should be large enough, with adequate ventilation and no drafts
   b. Keep stalls, pastures and other facilities clean and sanitary
      1. Manure, trash and other extraneous material should be removed. Avoid nails sticking out.
   c. Keep ample bedding in stalls

3. Keep horse well groomed
   a. Reduce possibility of skin infections and external parasite infestations.
   b. Prevents sores and galls.
   c. Reduce areas where bacteria can survive.

4. Keep feet clean and well trimmed to avoid foot troubles such as thrush, grease heel, etc.

5. Cool out properly so as to avoid colds and colic.

6. Do not overwork. Condition horse for work.

7. Provide sufficient exercise and sunlight.

Induce Immunity Where Available

1. Routine immunizations
   a. Immunize routinely against tetanus-toxoid and annual booster.
   b. Immunize routinely each year against Equine Encephalomyelitis. Eastern and Western
2. Vaccines which may be used when indicated
   a. Equine Influenza
   b. Leptospirosis
   c. Strangles or Distemper
   d. Rhinopneumonitis

3. Over 60 immunizing agents sold; need some, do not need others.

Therefore, the primary purpose of a horse health program is the prevention of health problems. The type of program that suits one individual owner or farm may not be applicable or practical for another. The same thing applies from one area of the country to another. Also the type of operation and its primary purpose influences the health program. The best person to contact would be your local veterinarian. He would have knowledge of diseases that exist in your area and he is a vital part of a successful health program. Quite a few of the larger establishments have resident veterinarians, local practitioners on retainers, or they use practitioners who have specialized in equine medicine. Every horse owner, large or small, should have a "family" veterinarian.

I will make no attempt to give you a health program because it would be impossible to meet each of your needs for the reasons we noted before. I am going to discuss some general measures which apply in most instances.

I. Management

This is an area which can be very important in a preventive health program. Such things as barn construction, stall size, type and care of fences, and general upkeep of the area where horses are kept should be considered. Damp, dark, and drafty barns cause many respiratory troubles in horses. Stalls that are too small or have protruding objects in them can result in many injuries. Fences in poor repair, no matter what type, almost always end up as the culprit in many of the bad, scar resulting injuries and wounds. A board on the top of a wire fence is a good investment. Continually clean up the area where the horses are in order to keep out pieces of boards with nails, old rusty equipment, etc.

Nutrition or feeding practices are involved in quite a few of the health problems. If you are mixing your own ration, instead of using a prepared commercial feed, consult with the Extension personnel at your agricultural college for help in making sure it is balanced. Some of the nutritional deficiencies are very vague and show up in unusual ways. Underfeeding, overfeeding, and feeding spoiled feed all can cause problems. Many cases of colic and founder are the result of feeding practices. Make sure the horse has access to fresh, clean water at all times.

Foot care is an important part of a preventive program. The old saying that any army travels on its stomach applies to the horse's foot - a bad foot results in no horse. Keep the feet clean and trimmed properly. Don't allow the animal to stand in a dirty damp stall - it may result in thrush or greasy heel.

II. Parasites

The control of internal and external parasites is a big part of a horse health program. External parasites such as lice and mange mites cause a lot of the skin conditions in horses. If these parasites become a problem, be sure you do not spread them with brushes, combs, tack, and other equipment. All skin problems should be checked at once because the earlier treatment is started, the better the results.

The fact that there are 56 types of internal parasites that a horse may have and the fact there is no one medicine or chemical that is effective against them all makes routine fecal examinations very important. Not only will the fecal exam show the type of parasite present and, therefore, the treatment needed but it will help to determine the worming schedule necessary. Sanitary feeding practices, proper manure disposal, and pasture rotation are helpful measures to keep parasite levels down. The routine periodic worming for ascarids, strongyles, bots, and pinworms is necessary. The products to use and method of administration can vary. This should be discussed with your veterinarian.

III. Immunizations or Vaccinations

A. Tetanus

Vaccinate all horses with tetanus toxoid. This is a 2-dose procedure with the doses at 4-8 week intervals. After the initial immunication they should receive an annual booster dose. Foals usually receive their first dose at 3 months of age. You should give brood mares their booster during late pregnancy. Foals may also receive antitoxin or toxoid at birth. Booster doses should be given after injuries or surgery.

B. Encephalomyelitis or Sleeping Sickness - Eastern and Western Type

All horses should be vaccinated annually at least 30 days before the times the disease usually occurs in your area, which is around the time mosquitoes become a problem. This is a 2-dose procedure with the 2nd dose 7-10 days after the 1st.

C. Strangles or Distemper

This is given annually with the initial immunication consisting of 3 weekly doses and then a booster dose once a year.

D. Influenza

Vaccination consists of 2 doses at 6-12 week intervals. Booster annually.

E. Viral Rhinopneumonitis of Contagious Abortion

Discuss with your veterinarian before starting a program of immunization. There are 2 types of vaccines available.

F. Leptospirosis

Not used routinely and only under direction of veterinarian.

IV. Breeding Operation

All mares should have a health certificate before entering a breeding operation. The vaccination record and worming history should be known on all horses. All animals should have routine fecal examinations performed on them and blood counts if necessary. Reproductive tract examination should be

routine with all mares and cultures done if necessary. Periodic semen examinations should be done on stallions. All immunications should be kept up to date. The strictest sanitary measures should be practiced during the breeding procedure. All safeguards that are possible should be used to protect the stallion, mare, and personnel involved.

V. Foaling

This is the time when the results of a year's planning, work, and waiting is rewarded. One of the first things to remember is not to get in a hurry, have patience, and do not be too eager to help. Provide the mare with a large, dry, well lighted stall but don't necessarily keep all the lights on. If the mare has been sutured, be sure she has been opened up. The mare should have her tail wrapped and her rear quarters washed.

The normal presentation of the foal is front feet first, with heels down, and nose close behind. If there is anything different than this, call for competent professional help immediately. If the foal is coming normal, don't immediately grab the feet and pull, but be sure the nostrils are clear and then let it alone. After the foal arrives, allow the mare and foal to lie quietly. Do not break the umbilical cord. Watch to be sure the mare does not injure the foal when she first arises.

Apply iodine to the umbilical stump of the foal when the cord breaks. The foal should be up within 30 minutes and nursing in 1 hour. Be sure the foal nurses because the first milk or colostrum is very important. In some cases the foals are given tetanus antitoxin, antibiotics, and an enema in the first 24 hours.

The mare should clean or pass all of the placenta within 30 minutes to 1 hour. If she retains the placenta more than 8 hours, call your veterinarian because a retained placenta can cause serious troubles in a mare. Weigh the placenta and save it for your veterinarian to examine. It should weigh 21-14 pounds.

Give the mare a warm bran mash and some lukewarm water. Take about 7-10 days to get the mare on full feed. Examine the mammary glands several times a day for any swelling or unusual heat. Watch the mare for signs of colic.

Be sure the foal continues to nurse, have bowel movements, and is active and alert.

VI. Miscellaneous

1. Teeth

An annual examination of your horse's teeth is an important part of a health program. The presence of caps, wolf teeth, points on molars, and abscess teeth are just a few of the conditions which can be found. If found at an early date, they can be taken care of and trouble prevented.

2. Records

A good record keeping system is important in any kind of a horse health

program. Every time something is done to or happens to an animal it should be put on the record. You should not attempt to trust all of this information to memory.

The question of what equipment and medicine you need to keep is frequently asked and is difficult to answer. Many factors such as type and kind of horse, the horseman's experience and his veterinarian, among others, influences the answer. What may be adequate for one would not be for another.

Following is a suggested list of items that would constitute a basic first aid kit:

1. thermometer
2. bandage scissors
3. mild disinfectant
4. white lotion
5. antiphlogistine powder
6. leg brace
7. liniment
8. healing powder and/or solution and/or ointment
9. eye medications
10. vaseline
11. bandages, cotton, gauze, tape, leg wraps
12. alcohol
13. iodine
14. a colic remedy and a cough medicine - only on your veterinarian's advice

Discuss these ideas with your veterinarian. There may be other things they would suggest based on their knowledge of your situation.

After having looked at some of the characteristics of healthy and sick horses and talked about a first aid kit, let's get down to some problems. To detect and "see" most of the characteristics discussed does not take a lot of expensive diagnostic equipment. These things can be detected by the use of the following equipment: <u>your eyes, ears, nose, hands and mind.</u>

Some of the common problems or ailments that affect horses will be discussed now. Hopefully, you will add to the printed material as we discuss these conditions. With all of these conditions, <u>consult your veterinarian as soon as possible</u>.

1. Colic

- not a disease but is a sign of pain in the abdomen
- determine where the pain is and what is the cause
- remove access to feed and water
- keep animal from rolling and thrashing
- keep animal on his feet if possible, but if it wants to lie quietly, that is alright
- don't get horse exhausted by forced exercise, as this makes prognosis worse
- note frequency, amount and condition of feces and urine and presence of gas expulsion

2. Laminitis or Founder

- cause will dictate course of treatment
- keep feet cool
- keep "heart mechanism" of foot activated by limited exercise
- remove feed and water immediately
- remove shoes

3. Azoturia - Typing up

- keep animal warm
- do not exercise
- reduce feed
- induce urination

4. Colds, Shipping Fever, Strangles, Distemper

- keep animal warm, dry, out of damp and drafty quarters
- reduce feed, use a palatable laxative feed
- keep fluids available
- keep checking temperature and condition of lymph nodes
- reduce exercise

5. Grease Heel, Thrush

- both are a result of dirty environment, so clean up area
- trim hair around fetlock
- keep frog trimmed so foot can be cleaned properly
- routine use of agents such as Iodine-glycerine, Kopertox, Clorox

6. Punctures, Wounds (nail in foot)
- clean up area around puncture
- if foreign body is still present, pour disinfectant such as Iodine around it before removing and then in wound as it is removed
- bandage or cover area and keep dry
- tetanus immunization

7. Eye Lesions, Wounds, Injuries, Problems

- need professional help early for a diagnosis
- do not treat without consultation
- may use a mild eye wash such as boric acid

8. Choke

- animal will be coughing, profuse salivation, painful anxious expression
- keep your hand out of mouth
- remove feed and water
- try to determine cause
- gently massage neck region anteriorly or toward head

9. Lameness

- examine foot for punctures and/or foreign bodies - close examination is important
- palpate leg and joints carefully
- if fracture or severe tendon injury has occurred, use temporary splint and support and transport animal to barn
- application of cold therapy is indicated early, followed, possibly, by heat or alternate heat and cold
- be sure and get extra support on leg opposite the injured one

10. Wounds

- area and extent of wound will determine course of treatment
- keep wound clean and control bleeding by pressure bandage
- if wound is contaminated, wash with saline solution or tap water - do not use disinfectants
- consult veterinarian about possibility of suturing before applying medications
- keep check for excess granulation tissue
- tetanus immunization

11. Foaling Problems

- colic
- laminitis
- delivery problems
- retained placenta
- retained meconium or constipation
- naval cord

CURRENT TOPICS IN EQUINE REPRODUCTION RESEARCH

Thomas N. Meacham
Associate Professor
Department of Animal Science
VPI & SU, Blacksburg, Virginia

In the past 5 years, more research has been done in the area of equine reproduction than in the preceding 40 years. With the development of new assay techniques the hormonal control of reproduction has been studied extensively in the past few years. The influence of nutrition on reproduction has also received needed attention. The role of seasonal changes has been examined and several basic concepts have evolved.

I. THE MARE

The mare has received the bulk of attention as she should. Scientists at various locations have fairly well mapped out the basic hormonal patterns in the mare's estrous cycle and found a great deal of variation exists among mares. Researchers are now attempting to manipulate the hormonal pattern to reduce some of this variability and thereby improve the reproductive efficiency of the mare.

One of the major problems under study in unpredictable time of ovulation during the estrous cycle. A solution to the problem is to inject a hormone known as HCG (human chorionic gonadotrophin) obtained from pregnant women. This hormone acts to ovulate the follicle within 24-28 hours. The injections are routinely made on the second or third day of heat and the mare is then bred on the following day. This procedure results in a marked reduction in the number of times a mare must be covered in a heat period. There has been some indication that certain mares become unresponsive to HCG after repeated treatment. This condition is currently being studied by researchers at California.

Another area of concern to the breeder that is receiving attention currently is the "psuedo-pregnant" mare. This mare fails to respond to teasing for several months, yet is not pregnant. It has been shown that this is usually caused by a 'persistant' corpus luteum on the ovary. This CL for some reason fails to regress normally 14 days after ovulation and continues to produce progesterone. An injection of prostaglandin ($PGF_{2\alpha}$) or a commercially available analog will cause the CL to regress and the mare will cycle normally again.

A somewhat similar problem has also been studied. Mares may show no outward evidence of being in heat or estrus but may be ovulating normally. In these cases the mare may be palpated routinely to follow the development of the follicle. When the follicle has reached an ovulating condition, the mare can be inseminated artificially. Often, HCG may be used here to insure ovulation takes place at the right time.

When we discuss ovarian palpation, the question often comes up regarding the reduction in fertility due to palpation. Studies in California have shown that if palpation is properly done, there is no reduction in conception rates.

If we could regulate the occurrence of estrus and ovulation in groups of mares, many of the management problems in breeding horses would be solved. Recent studies at Colorado, Wisconsin and Michigan have shown that the hormone like compound prostaglandin ($PGF_{2\alpha}$) offers considerable promise. This compound

causes the regression of the CL and the return to estrus 3 to 4 days post injection. Using two injections 14 days apart, we can bring a group of mares into heat within 3 to 6 days of each other. Where artificial insemination is employed, having a number of mares in estrus at the time allows maximum use of the stallion's semen. The stallion can be collected and the ejaculate diluted and 5-8 mares bred with that ejaculate instead of one. On the other hand, if we have a number of mares cycling naturally at the same time and we want to spread them out, prostaglandin can be used here also. To spread the estrous periods out, we can inject some mares with $PGF_{2\alpha}$ in mid cycle, shortening the interval to the next heat period. These mares will then be in 'season in between the others. Prostaglandin has also been used to regress the CL from the foal heat, allowing the mare to return to estrous 15-18 days after foaling. This permits a few more days to recover after foaling without having to wait the full 21 days after foal heat.

It should be mentioned here that the prostaglandins are not wonder drugs. They are only effective if the mare has a functional CL on the ovary. They will not cause a mare to start cycling in the anestrous season nor overcome disease or infectious conditions.

A major concern to horse breeders is the seasonal effect on the mare's cycling. Most mares do not cycle during the winter and early spring. This creates problems when we try to produce early, January and February, foals. A number of hormone treatments have been tried without much success. Since the breeding season is controlled by the length of daylight, subjecting the mares to artificial light has been quite effective. Work at the University of Wisconsin and elsewhere indicates that exposing the barren or maiden mare to 16 hours of light and 8 hours of darkness around the 15th of November will hasten the onset of estrous cycles by 6 to 8 weeks. California studies show that an abrupt change to 16 hours of light is just as effective as a gradual increase. Work at Michigan demonstrated that 11 of 18 mares were cycling within 130 days after exposure to 16 hours of light starting in mid-December. Only 2 of 18 other mares had cycled during this same period without additional light.

Further attempts to control reproduction have involved inducing parturition in mares with a synthetic corticosteroid, dexamethazone. Starting on day 321 of gestation, daily injections were given through day 324 or until parturition. The five treated mares foaled within two days, 322-324. The control mares foaled over a 22 day period. This technique offers the possibility of "scheduling" foaling to suit the management.

A problem rather unique to the mare and one that is of real economic concern is the mare that aborts about 3-5 months into gestation. A deficience of progesterone hormone has been indicated as a possible cause. Several studies are currently in progress to examine the problem and determine if it is in fact a progesterone deficiency and if so, establish treatment regimes to correct the condition. We are working on this problem here at Virginia Tech in cooperation with a veterinary hospital in the state.

Multiple ovulations have been shown to occur in approximately 25% of the heat periods, a much higher incidence than was previously thought. Only 2-5% of these twine ovulations result in multiple conceptions. Ovarian palpation will detech this problem and it is recommended that the mare not be bred at that estrus.

The role of nutrition in reproduction has been of interest to many people. Current evidence reveals that conception rates are highest when mares are in a

thriftly, gaining condition at breeding. This means a bit on the thin side, but gaining weight. Obese mares require more services per conception than trim mares. For the first eight months of pregnancy, a balance maintenance ration is adequate. It is only during the last 2-3 months that the mare requires additional nutrients due to pregnancy. The products of conception, fetus and membranes, weigh about 10% of the mare's body weight. The mare should gain about 5% during gestation. During the final 2-3 months, an increased level of protein and calcium and phosphorous will be needed to insure optional fetal growth, without fattening the mare. Research from the Ralston Purina Co. has shown that mares fed excess energy during late gestation actually produce lighter weight foals and reduced conception rates after foaling. Mares fed recommended levels of TDN, (8.5-9 lbs./day) produced foald weighing 115 lbs. compared to birth weights of 106 lbs. for mares receiving 11 lbs. of TDN daily. Foaling rates were 88% and 49% for the normal and high TDN groups, respectively.

Deficiencies of protein, calcium and phosphorous all can result in weak, defective foals at birth. It sould be emphasized that excessive mineral supplementation can be equally harmful. Excess calcium and phosphorous can cause calcification of tissues, particularly heart muscle, in the fetus. Mineral supplementation must be in accordance with the published recommendations. The calcium and phosphorous ratio is as important as the amount of these minerals in the ration. The ratio should be between 1.1:1 and 3.0:1 calcium:phosphorous. It has been demonstrated many times in all species that obesity causes difficulties at birth.

There is no evidence to indicate that the reproductive process requires any special or exotic nutrient sources. A properly balanced ration of good quality feedstuffs fed at the correct levels will meet the nutritional needs of the mare for normal reproduction.

II. THE STALLION

The stallion has not received the research attention accorded the mare. The limited work being done has centered around effort to establish the endocrine patterns controlling sperm cell production and sexual behavior of the stallion. The influence of season of the year has also been studied.

Research at Colorado State has shown that the stallion is definitely responsive to seasonal changes. Weekly semen collections were made over a 13 month period and evaluated. Semen production and libido both decline during the winter months and improve as the days become longer in the spring. Volume of semen and sperm concentration were lowest during December and January and reached a peak in June and July. Motility of the sperm varied throughout the year with no definite high or low points. These data indicate that the stallion can be overworked and exhibit reduced fertility much more easily early in the breeding season, February and March, than later in May and June when semen production is maximal. The estrous cycles of the mare are also much more irratic early in the year which compounds the problem.

Low fertility is most often the result of bad management. Overworked stallions may be subfertile due simply to a lack of viable sperm cells. Stallions that are used excessively as teasers without the opportunity to mate soon lose libido and fail to perform.

Nutrient requirements of the stallion have received limited research attention. At the present time, there is no evidence to indicate a special

nutrient requirement for reproduction. A properly balanced ration of good quality feedstuffs that will maintain the stallion in good condition will meet the reproductive needs. Additional energy above maintenance may be needed during the breeding season due to the increased activity of the stallion. Again, the overweight, soft stallion will not be as aggressive as a breeder as the horse in a trim hard condition.

Equine Nutrition Research Review

J.P. Fontenot and V.A. Bowman
Department of Animal Science
Virginia Polytechnic Institute and State University
Blacksburg, Virginia

Interest in horses has been increasing during the past several years. In 1918 there were 27 million horses and mules in the U.S., mostly heavy working animals. The numbers fell as mechanization in agriculture increased. The horse population was down to 3 million in 1960. A large increase has occurred since then, and in 1972 the number was up to 7 million.

Only very limited research is being conducted on the nutrition of horses, compared to other domesticated animals. Speed and endurance records on the tracks have not changed much during the past 80 years, whereas remarkable increases in efficiencies have occurred in other animals such as poultry, swine and dairy cattle. Perhaps, the difference in the amounts of research conducted accounts for the discrepancy.

Much of the information on which feeding recommendations are made was obtained with draft horses and cattle. Some of the master horsemen do a good job of feeding horses, based mainly on skills and expertise handed down from one generation to another. Modest research accomplishments are being made by a small group of devoted scientists. The results of that research will be summarized.

Digestion of Feed

In the native state horses consumed large amounts of fibrous feeds. They are able to digest fiber by virtue of microbes in the cecum and colon. The action is similar to that which takes place in the rumen of cattle. Horses are apparently not as effective as cattle in digesting high fiber feeds (table 1), but they do a good job with low fiber feeds. The cecum and colon make up a smaller volume than the stomach compartments of cattle, expressed as percent of the digestive tract or of bodyweight. Also, digestion of fiber in cattle takes place toward the front of the digestive tract, allowing for more absorption, further digestion and digesting of the microbes, compared to the cecum and colon of the horse which are toward the rear.

TABLE 1. AVERAGE DIGESTIBILITY VALUES OF DIETARY COMPONENTS IN HORSES AND CATTLE

Item		Organic matter	Crude protein	Crude fiber
		%	%	%
High fiber Feeds	Horses (63)	51	56	38
	Cattle (24)	60	56	52
Low fiber Feeds	Horses (35)	79	79	56
	Cattle (10)	79	75	24

Robinson and Slade (1974)

Cornell workers have shown that the fibrous portion of a number of roughages was more highly digested *in vitro* by rumen bacteria than cecal bacteria. Indication was obtained that cecal microbes adapted to hay,digested forages better than those adapted to hay plus grain. In ruminants adding grain usually depresses fiber digestion. The horse is frequently compared to the rabbit concerning its ability to utilize fiber. However, as shown in table 2, it appears that the horse is superior to the rabbit in fiber and energy digestion. It is not clear how important the cecum is for digestion in the horse. Ohio workers reported lower neutral detergent fiber digestion by ponies with removed ceca, compared to those with intact ceca. Texas workers reported higher dry matter digestion in the entire digestive tract than in the tract prior to the cecum in Quarter Horses.

TABLE 2. MEAN APPARENT DIGESTIBILITY COEFFICIENTS FOR RABBITS AND HORSES

Item	Rabbits	Horses
	%	%
Dry matter	47.4	70.0
Crude protein	80.2	53.0
Acid detergent fiber	25.0	47.5
Cell wall constituents	36.7	68.9
Ether extract	93.9	99.2
Ash	36.4	31.0
Digestible energy	49.3	79.9

Schurg *et al*. (1977).

Growth

Growth patterns were recently reported for ponies by a Minnesota worker, for thoroughbreds by Cornell workers and for Arabians by Cal Poly (Pomona) workers. The pony study included 198 head ranging from foals to lactating mares. The growth curve of ponies from birth to 1 year of age was about a straight line, tended to slow down thereafter, and mature weight was reached at about 3 years of age (figure 1). The Thoroughbred records were from 1992 foals under 18 months of age. Colts were heavier than fillies at birth and the difference increased during the measurement period (18 months). Mares less than 8 years of age and older than 12 years had lighter foals at 18 months. Foals born in April, May or June were heavier at birth and at 4 to 18 months than those born in January, February or March. Growth and development of 75 Arabians from the W. K. Kellogg Arabian Horse Center at California State Polytechnic University, Pomona, were studied from birth to 60 months of age. The fastest maturing measurement was in length of body for males and length of body and height at hip for females (36 months). Average mature size at maturity was greater for males than females for all measurements except length of body. Age-weight relationships for males and females are shown in figure 2.

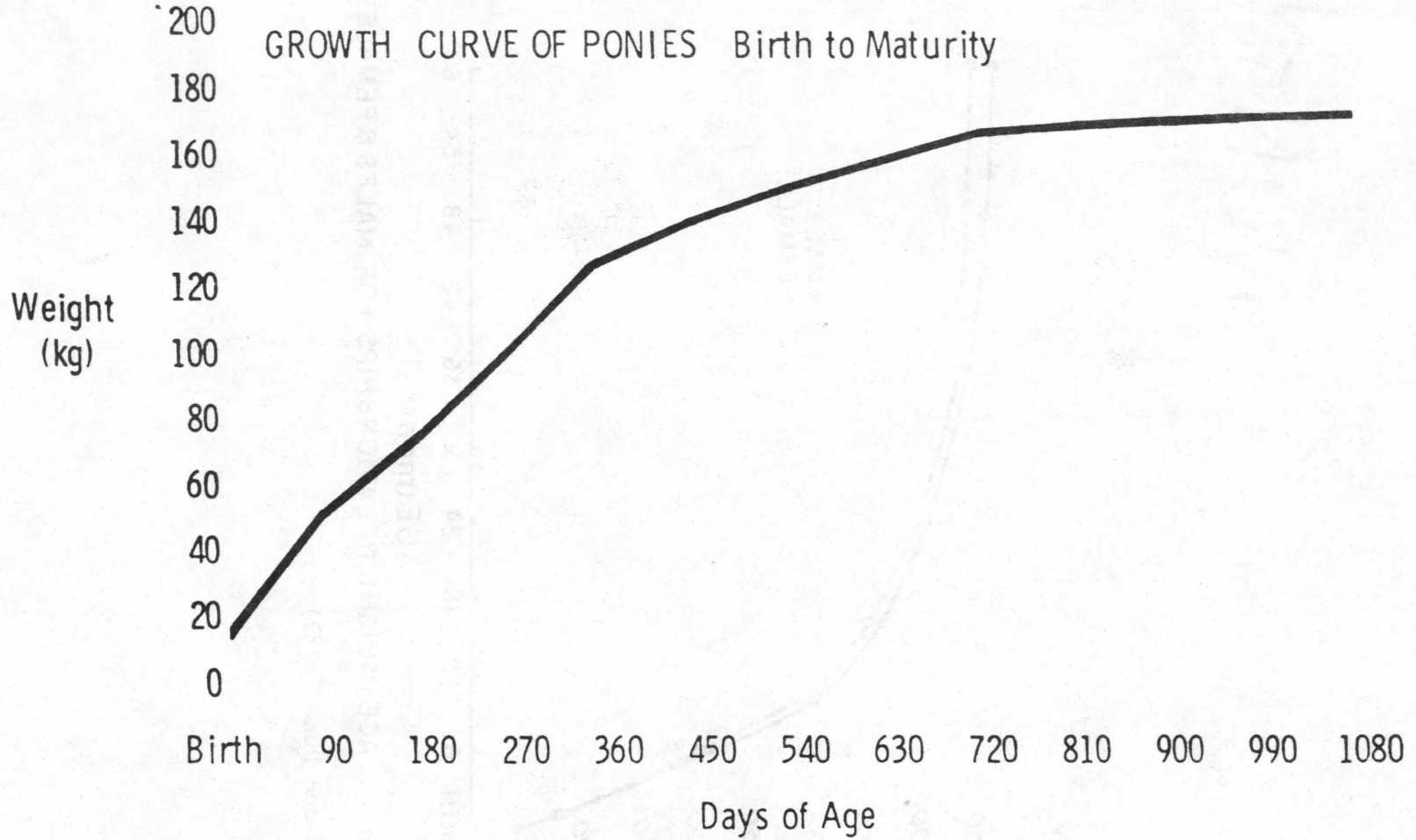


Figure 1.

Jordan (1977)

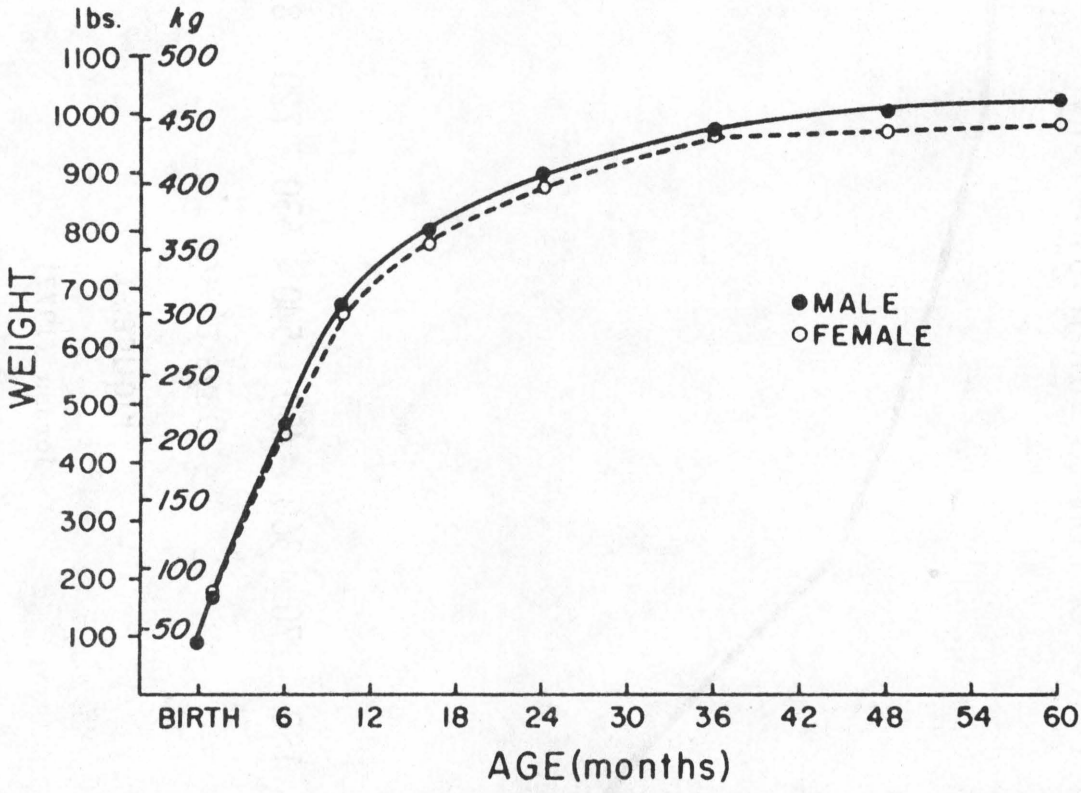


Figure 2. AGE-WEIGHT RELATIONSHIPS FOR MALES & FEMALES

Reed and Dunn (1977)

Energy

Since the primary purpose of horses in the U.S. is for pleasure, involving work by the horse, considerable emphasis has been placed on energy nutrition of the horse. Energy expenditure increases with exercise, especially strenuous exercise.

Researchers at Theracon, Inc., Topeka, Kansas reported that the digestible energy requirement for maintenance of geldings was 33.8 kcal per kilogram of bodyweight (15.3 kcal/lb.). Illinois workers reported that Quarter Horse mares required 1188 kcal digestible energy per kilogram of milk produced. Texas researchers found that yearling horses of Quarter Horse breeding weighing 680 lb. and gaining 1.5 lb. per day required 20.73 Mcal of digestible energy per day. This value is about 23% higher than that reported by NRC for a similar horse gaining 1.2 lb. per day.

Colorado workers reported evidence that horses fed fat supplemented rations were able to endure stress of endurance type work better than those fed rations supplemented with protein or carbohydrates. Recently, researchers at Virginia and Kentucky obtained evidence of good digestion of corn oil by equine. More research is needed concerning utilization of fat by high performance horses.

Protein

The protein requirement of horses is quite high during early growth, then decreases up to maturity. However, the requirement is increased dramatically in the mare at peak lactation. Texas researchers reported that 504 g of digestible protein were required by yearling Quarter Horses weighing about 680 lb. and gaining 1.7 lb. per day. This compares to the NRC value 472 g for a comparable horse gaining 1.2 lb. per day. Florida workers concluded that 14.8% crude protein was adequate in a grain ration containing 1.36 Mcal digestible energy per pound for optimum growth and development of foals 8 months or older.

Since considerable microbial activity takes place in the cecum and colon it has been suggested that the horse can utilize non-protein nitrogen. California workers found that feeding urea increased nitrogen retention in mature horses. They suggested that the improvement was due to microbial synthesis of protein or free amino acids and subsequent absorption. Ohio researchers obtained evidence that urea was utilized by ponies. Cornell workers reported similar retention of absorbed nitrogen in ponies fed urea, soybean meal or linseed meal. They concluded that equines can utilize urea to increase nitrogen retention when fed low protein diets, but generally, efficiency of utilization of absorbed nitrogen from urea is less than that from preformed protein.

Research by Kentucky scientists indicate that protein synthesis in the cecum is of doubtful value to the horse. They found no evidence that radioactive carbon from microbes administered in the cecum was present in amino acids going to the liver. Later they found that lysine administered in the cecum was not absorbed. They concluded that no appreciable amino acid absorption occurs from the cecum or colon of equine. These results indicate that protein quality (amounts and proportions of essential amino acids) is important in the horse. Some evidence

of a beneficial effect of supplementing lysine to rations containing cottonseed meal was reported by Texas workers. Florida researchers reported that .5% lysine was sufficient for growth of 8-month-old foals. Gelatin has been recommended for treatment of defective hoofs, but Cornell workers recently reported that gelatin supplementation did not affect elasticity or strength of the hoof.

Digestible protein is frequently used in balancing rations for horses. However, tags on commercial feeds give guarantees in terms of crude protein. California researchers have developed a regression equation to calculate digestible protein from crude protein:

D.P. (%) = .800 X % C.P. - 3.30, where D.P. refers to digestible protein and C.P. refers to crude protein.

Minerals

Bone problems are more common in horses than in other animals, so, much emphasis has been placed on mineral nutrition, especially calcium and phosphorus. Cornell researchers estimated that the optimum calcium to phosphorus for horses was 1.4:1 to 2:1. It is especially important that the phosphorus does not exceed the calcium level. Kentucky researchers found that high calcium (Ca:P ratios of 4.1:1 and 7.25:1) can be harmful to phosphorus digestion. Cornell workers reported that true absorption of calcium and phosphorus was similar from dicalcium phosphate, steamed bonemeal and a combination of ground limestone and monosodium phosphate. Louisiana workers have reported that hair composition is not a good indication of calcium and phosphorus status of ponies.

The potassium requirement of ponies was reported by Cornell workers to be 70 mg/kg bodyweight per day. This would be about 0.007% of the ration, which would be met under usual feeding or grazing situations. Minnesota researchers reported that ponies were quite resistant to copper toxicity.

Vitamins

Horses have a physiological requirement for the vitamins required by large animals, but do not necessarily have a dietary requirement for all of these because of synthesis mostly by microbes in the digestive tract. Horses have a dietary requirement for vitamin A or its precursor, carotene. Usually, horses obtain sufficient vitamin D from exposure to sunlight or sun cured hay.

Microbes in the digestive tract synthesize B-complex vitamins, but there have been reports of specific deficiencies. However, the amounts usually supplied in the feed plus the amounts synthesized in the digestive tract provide sufficient amounts for most horses. It appears that sufficient amounts of vitamin K are synthesized by the microbes in the digestive tract.

Horses have a dietary requirement for vitamin E, but the amounts have not been determined. Rations containing good quality feedstuffs probably supply sufficient amounts. There is no clear evidence that supplementation of vitamin E Helps prevent reproductive problems in horses. It has been shown by researchers from Theracon, Inc., Topeka, Kansas that ascorbic acid (vitamin C) is not a dietary requirement of mature horses.

Early Weaning

Within the last few years there has been increased interest in early weaning of foals. Researchers from Ohio, Maryland and Ralston Purina Co. have obtained similar performance of early weaned foals as those left on the mare and weaned at conventional times. In order to obtain satisfactory performance in the early weaned foals, they will have to be fed properly, however. The mare produces substantial amounts of milk which is rich in nutrients. Milk production and the amounts of energy, protein, calcium and phosphorus supplied by the milk from lighthorse mares (1100 lb.) at different times during lactation are shown in table 3. The nutrients supplied by the milk will have to be provided by palatable and nutritious feed if the foal is weaned early.

TABLE 3. DAILY MILK AND NUTRIENT PRODUCTION BY THE BROODMARE[a]

Mo. of lactation	Milk prod.	Dig. E.	Dig. pro.	Calcium	Phos.
	lb.	Kcal	g	g	g
0 - 1	30.6	7928	412	16.7	12.1
1 - 2	32.3	8089	464	14.7	9.0
2 - 3	37.2	8353	764	13.5	8.1
3 - 4	33.2	7168	716	10.0	6.9
4 - 5	24.0	5078	517	7.1	5.0
5 - 6	16.5	3491	356	4.9	3.5

[a]Light horse (1100 lbs.).
Ott (1977).

References

Albert, W., J. Wolf, A. Rodiek and L. Taylor. 1977. Energy needs of gestating lactating mares. Proc. Fourth Equine Nutr. and Physiol. Symp., p. 48.

Berger, J. C. A., W. J. Tyznik, J. H. Kline and K. E. Ekstrom. 1977. Fiber digestion in the equine cecum. Proc. Fourth Equine Nutr. and Physiol. Symp., p. 42.

Bowman, V. A., J. P. Fontenot, K. E. Webb, Jr. and T. N. Meacham. 1977. Digestion of fat by equine. Proc. Fourth Equine Nutr. and Physiol. Symp., p. 40.

Breuer, L. H. 1975. Effects of mare diet during late gestation and lactation, supplemental feeding of foal and early weaning on foal development. Proc. Fourth Equine Nutr. and Physiol. Symp., p. 85.

Butler, K. D., Jr. and H. F. Hintz. 1977. Effect of level of feed intake and gelatin supplementation on growth and quality of hoofs of ponies. J. Anim. Sci. 44:257.

Flodin, L. and W. J. Tyznik. 1977. The effect of two vs. four month weaning on the growth rate of foals. Proc. Fourth Equine Nutr. and Physiol. Symp., p. 99.

Hintz, H. F. and H. F. Schryver. 1972. Availability to ponies of calcium and phosphorus from various supplements. J. Anim. Sci. 34:979.

Hintz, H. F. and H. F. Schryver. 1972. Nitrogen utilization in ponies. J. Anim. Sci. 34:592.

Hintz, H. F., H. F. Schryver and J. E. Lowe. 1975. Potassium requirements of the horse as determined by the balance trial method. Proc. Fourth Equine Nutr. and Physiol. Symp., p. 47.

Hintz, H. F., R. L. Hintz, H. F. Schryver and D. Van Vleck. 1977. Analysis of growth rate of thoroughbreds. Proc. Fourth Equine Nutr. and Physiol. Symp., p. 72.

Householder, D. D., G. D. Potter and R. E. Lichtenwalner. 1977. Digestible energy and protein requirements of yearling horses. Proc. Fourth Equine Nutr. and Physiol. Symp., p. 126.

Householder, D. D., G. D. Potter and R. E. Lichtenwalner. 1977. Nutrient utilization in different segments of the equine digestive tract. Proc. Fourth Equine Nutr. and Physiol. Symp., p. 44.

Jordan, R. M. 1977. Growth pattern of ponies. Proc. Fourth Equine Nutr. and Physiol. Symp., p. 63.

Kane, E. and J. P. Baker. 1977. Utilization of a corn oil supplemented diet by the horse. Proc. Fourth Equine Nutr. and Physiol. Symp., p. 41.

Koller, B. L., H. F. Hintz, J. B. Robertson and P. J. Van Soest. 1977. Comparative cell wall and dry matter digestion in the cecum of the pony and the rumen of the cow. Proc. Fourth Equine Nutr. and Physiol. Sym., p. 43.

Lieb, S. and J. P. Baker. 1975. Effect of high calcium intake on phosphorus metabolism. Proc. Fourth Equine Nutr. and Physiol. Symp., p. 60.

N.R.C. 1973. Nutrient Requirements of Horses. National Academy of Sciences, Washington, D.C.

Nelson, D. D. and W. J. Tyznik. 1971. Protein and nonprotein nitrogen utilization in the horse. J. Anim. Sci. 32:68.

Ott, E. A. 1977. Nutrition for the breeding farm horses. Proc. Second National Horsemen's Seminar, p. 51.

Ott, E. A. and J. P. Feaster. 1975. Protein levels for young horses. Proc. Fourth Equine Nutr. and Physiol. Symp., p. 12.

Potter, G. D. and J. D. Huchton. 1975. Growth of yearling horses fed different sources of protein with supplemental lysine. Proc. Fourth Equine Nutr. and Physiol. Symp., p. 19.

Robinson, D. W. and L. M. Slade. 1974. The current status of knowledge on the nutrition of equines. J. Anim. Sci. 39:1045.

Schurg, W. A., D. L. Frei, P. R. Cheeke and D. W. Holtan. 1977. Utilization of whole corn plant pellets by horses and rabbits. Proc. Fourth Equine Nutr. and Physiol. Symp., p. 58.

Slade, L. M., L. D. Lewis, C. R. Quinn and M. L. Chandler. 1975. Nutritional adaptation of horses for endurance type performance. Proc. Fourth Equine Nutr. and Physiol. Symp., p. 114.

Slade, L. M. and D. W. Robinson. 1970. Nitrogen metabolism in non-ruminant herbivores. II. Comparative aspects of protein digestion. J. Anim. Sci. 30:761.

Slade, L. M., Robinson, D. W. and K. E. Casey. 1970. Nitrogen metabolism in nonruminant herbivores. I. The influence of nonprotein nitrogen and protein quality on the nitrogen retention of adult mares. J. Anim. Sci. 30:753.

Smith, J. D. and R. M. Jordan. 1975. Some effects of increased dietary copper on ponies. Proc. Fourth Equine Nutr. and Physiol. Symp., p. 49.

Stillions, M. C. and W. E. Nelson. 1972. Digestible energy during maintenance of the light horse. J. Anim. Sci. 34:981.

Stott, J. W. and J. P. McCall. 1975. Maximizing early development of the equine. Proc. Fourth Equine Nutr. and Physiol. Symp., p. 87.

Wysocki, A. A. and J. P. Baker. 1975. Utilization of bacterial protein from the lower gut of the equine. Proc. Fourth Equine Nutr. and Physiol. Symp., p. 21.

Wysocki, A. A. and R. H. Klett. 1971. Hair as an indicator of the calcium and phosphorus status of ponies. J. Anim. Sci. 32:74.

"How To" Have Fun with 10 Youngsters and One Horse"

VAULTING

Gymnastics on the Moving Horse

Barbara Baird, Coach
Loudoun 4-H Vaulting Team

This ancient art dating from the Roman era is fast becoming one of the most popular equine activities among the younger set. Probably somewhat due to the popularity of Olympic gymnastics and its emphasis in the school P.E. programs; but I think mostly because it is the greatest FUN activity for equine enthusiasts that I have found yet. An extra advantage is the fact that you can work a team of 10 vaulters with one horse - solving a lot of that common problem of having club youngsters that want to get involved but do not have a horse of their own.

Advanced riding skills are NOT a pre-requisite. It has a special teaching advantage for the rank beginner - even one who has never been on the back of a horse. It teaches youngsters to "become more supple and graceful in following the movement of the horse, their rhythm improves, and they become more confident and courageous. In short, they truly become one with the horse - the goal of all serious riders."[1]

I do not profess to be an authority on vaulting. I have learned all I know from a short clinic with Liz Searle; from Sharon Davis, an American Vaulting Association judge; from the monthly AVA News; and MUCH from the young people I work with. Our team is a FOR FUN team and has only ever been involved in local non-recognized competitions. However they have pursued their skills to the point where they can provide vaulting exhibitions within our state....and they do love showing off their skills! This is one phase of horsemanship where everyone always shows up for practice....and they never want to quit!

"HOW TO DO IT"

I. Equipment

a. Vaulting Surcingle - equipped with 2 rigid hand grips, foot loops, stand-up rein, rings on sides for sidereins.
b. Sheepskin protector for surcingle
c. Snaffle bit and bridle
d. Longe Line - Length from horse's mouth to longer's hand must be at least 7 meters. Use french style attachment: Pass longe line through near-bit-ring, over head, and attach to off-bit-ring. This prevents bit from being pulled through the horse's mouth.
e. Sidereins
f. Long whip - long enough to reach horse
g. Back pad - optional
h. Leg bandages - optional
i. Plaited mane - required in competition
j. Tennis shoes for vaulters.

[1] Vaulting - The Art of Gymnastics on the Moving Horse by Elizabeth Friedlaender Searle.

II. Horse

a. Any breed - with irreproachable character and good temperament.
b. Any size - preferably 14.0 hands to 15.3 hands
c. Strong, broad back; healthy legs; smooth gaits and transitions; slow at canter and trot.
d. Obedient on the longe line
e. Tolerant - one that will let the youngsters literally crawl all over him without kicking or bucking. Often the backyard 4-H pony meets this demand.

III. Horse Training

a. At Standstill: with vault-ons, dismounts, exercises on horse
b. Moving on Longe: To obey voice commands. ESSENTIAL TO MOVE HORSE IN BOTH DIRECTIONS at walk, trot and canter in a 13 meter circle. Vaulters move along longe toward horse and in stride with horse - dropping back if horse tends to stop. Keep sending vaulters toward horse until he accepts vaulter moving along his side in stride with hands on grips -- without stopping. Start first at walk, progressing to trot and then canter. Do same with vault-ons and dismounts until the horse offers to move on during these moves without hesitation. CAUTION: Longer must keep the horse moving - NEVER allow vaulter to hit or kick the horse to keep him moving. This could spell disaster later on.
c. REWARDS for the horse are a MUST. Team members reward horse with pets, some kind words and perhaps even a tid-bit after practice. During training encourage horse by pats and voice when he performs well.

IV. Safety (From AVA Manual)

a. Safety in vaulting must always be a prime concern of the instructor and the judge. With correct preparation, vaulting should be safer than riding. In the interest of safety (besides consideration for the horse) mechanics should be mastered on the ground or barrel before working on the horse.
b. Keys to safe vaulting -
    1. Always warm up sufficiently on the ground or barrel to loosen muscles and joints.
    2. Always land with knees bent - NEVER LOCKED!
    3. Be sure footing is level, with no holes or rocks, and springy in order to cushion the shock of landing.
    4. Avoid exercises where the feet are all the way through the cossack-hang loops.
    5. Master the mechanics of good form before attempting exercises which might be beyond the capabilities of the vaulters.
    6. Be sure that the vaulting horse is properly schooled and has no tendencies towards bucking, kicking or bolting, should an exercise fail.
    7. Be sure the equipment is of good quality and kept in good repair and good condition.

I firmly believe that vaulting is one of the safest equine sports available to youngsters today. The horse is always in control of the longer. This provides a truly controlled situation. The riders learn HOW TO fall from

the horse without injury to themselves. This in itself is worth the effort of training. Our experience is that falls have always been met with laughter on the part of the vaulter, the team and the spectators. There is never any embarrassment as falling is just another part of the FUN aspect of vaulting. I also think you will find that falls are relatively rare and only occur occasionally on the first or second attempt of a new exercise.

V. Warm Up

a. Ground exercises for vaulters: Tumbling, leap frog, etc.
b. Leather horse or barrel work
c. Warm up horse in BOTH directions at walk, trot and canter.

VI. Compulsories or Basic Exercises:
Basic Seat, Flag, Mill, Flank, Stand & Sissors - With Stress on Good Form!

a. Vault-on: Each compulsory exercise begins with a vault-on or mount and then to the basic seat.
b. Vault-off: For basic seat, flag, and mill use the simple dismount. The flank dismount uses a half-flank off to the outside and the stand and sissors require a half-flank dismount to the inside.
c. Every vault-off should end with a gymnastic finish (landing immobile with feet together, knees bent and arms outstretched.)

VII. Kur

In the Kur section of competition the vaulters have the opportunity to show their artistry in planning an original program around their own capabilities, as well as their specialties in single, double and triple free style exercises.

The Kur can be breathtaking by virtue of its beauty, artistry and the confidence and security of the vaulters in all of the exercises performed.

The youngsters love working out doubles and triples on the horse and it is something they must work out for themselves. It makes for great fun and TEAMWORK and they never give up -- but work diligently to master their exercise. When they meet with success, their pride and sense of accomplishment is shown through the sparkle in their eyes, the grins on their faces, and the handshakes of their team mates and applause of their audience. You KNOW they are having fun when they keep asking "Can we do it again - just one more time?". As a coach, perhaps the hardest and most important task is to have to call a halt to practice and call to the minds of the enthusiastic vaulters that the horse has had enough for one day.

The horse's reward comes when the team converges on their mount at the end of practice to pat him, love him, brush and talk to him. I have a deep feeling that the horse is NOT JUST TOLERANT of it all, but that he has had FUN too. He just cannot help but sense the excitement, the joy and confidence of his vaulters and their respect for him -- and the FUN they all have had.

SLIDES: Loudoun 4-H Vaulting Team
MOVIE: International Day at Stuttgart 1974. Taken by J. Ashton Moore and shows Mr. Paul Lorenz's fabulous demonstration of longeing 3 horses at once while his team performs simultaneously on all 3 horses. Shows U.S. team.
FOR ADDITIONAL INFORMATION: Vaulting Fests and Competitions, Rules and Scoring; Details on form and diagrams of proper techniques, Membership, AVA News, etc. contact: AVA Membership Secretary, Adrienne Stang, 20449 Glen Brae Drive, Saratoga, California 94070

EQUESTRIAN THERAPY FOR SPECIAL RIDERS

Barbara Baird
Aldie, Virginia

Therapeutic enrichment horseback riding programs in Virginia, for the physically and mentally impaired, continue to grow. These programs provide rewarding experiences for all involved. Hundreds of Virginia 4-Hers, Pony Club members, Moms, Dads, horsemen and women, and many not directly associated with horses, have become active as volunteers in Virginia's programs. Volunteers are continually needed as program coordinators, pony leaders, side walkers, and as stable management instructors. Those presently involved keep coming back to share the excitement and fun with the special riders who benefit from this program.

For examples of these experiences let's look at the immobile youngster who lives within the confines of his wheelchair. That young person can cover alot of ground while astride the horse and at the same time can take a new look at his world from a different view. He is totally unaware of the fact that he is receiving therapy from the movements of the horse---he's just having fun!

Amazing but true is the ten year old girl who can tell you every part of the horse, the bridle and the saddle, and she is totally blind. She can tack the pony for her ride and says "I like to ride because I can SEE the breeze on my face."

The medical professionals have found that physical therpay from horseback riding provides added benefits for most all disabilities. It is most always used as a supplement to a clinical therapy program. However the horse is unique in providing the important happiness concept so needed by these special riders. Therapy takes on new form and a true companionship developes between the horse and rider. Strange but true is the fact that even the special trained horse reacts with an understanding and compassion toward his disabled rider. That horse just seems to know!

The North American Riding For The Handicapped Association, (NARHA) was founded in Virginia and is the national organization which sets standards and guidelines for operating groups throughout the nation. Information and films are available through NARHA, P.O. Box 100, Ashburn, Va. 22001.

VIRGINIA PROGRAMS:

Therapeutic riding has been a part of the Charlottesville Rehabilitation Center for some time.

The Old Dominion School for Therapeutic Horsemanship, Inc., has been active for the past three years in the Great Falls and Lorton areas. The program has a new location for the 1979 sessions which will start April 1, 79. The use of facilities at

Hidden Spring Farm, Great Falls, Va., has been donated by its owners, Mr. and Mrs. Harry Dougherty.

The Loudoun 4-H Riding For The Handicapped, Inc. was formed in 1974 as a pilot program for Virginia 4-H and now conducts four ten-week sessions annually. Morven Park Equestrian Institute in Leesburg, Foxcroft School in Middleburg and Montresor Camp, Leesburg all donate the use of their facilities for this program.

The Orange County 4-H Handicapped Riding Program has plans underway for their third consecutive summer program in '79. All of these programs have been extremely successful in offering therapeutic riding.

Riding experiences and animal related opportunities are offered each summer to some 800 mentally retarded at Camp Virginia Jaycee, Blue Ridge, Va. The Easter Seal Camp near Lexington and the Muscular Dystrophy Camp at Montresor in Leesburg also offer riding experiences each summer for the physically disabled. Programs are presently under consideration at Longwood College and in the Richmond and Clifton areas.

Most all programs are funded by private contributions with some receiving additional support from foundations. Program costs involve insurance, special equipment and instructors fees. Benefit horse shows have contributed to many programs but much more of this type funding is needed to aid existing programs. Ride-a-thons by the special riders themselves have contributed to the Old Dominion and Loudoun programs. Loudoun County's extremely successful Ride-a-thon was organized and conducted by one of its program participants, Miss Wendy Shugol. Physically impaired herself, Wendy is a teacher in the Fairfax County schools.

STATISTICS: Currently there are approximately 200 develop- persons enrolled in Virginias NARHA approved therapeutic programs. An approximate additional 1200 are currently receiving riding experiences through summer camps. We have but scratched the surface!

National statistics claim that 10% to 11% of the total population are developmentally disabled. Using the national percentages, this would mean that there are 573,694 disabled persons in the state of Virginia. Breakdowns for a few disability types for Virginia are: 3% or 156,462 mentally retarded persons, 1% or 52,154 persons with epilepsy or seizure disorders, .o3% or 1564 autistic persons, and 3% or 15,646 cerebral palsied. These figures tell us one thing. The potential for therapeutic riding programs in Virginia is unlimited! The horsemen and women have the tool, and the challenge needs to be made.

WHAT CAN YOU DO? Become involved! Volunteer your services and work with an existing program. Train your horse for special

riders and donate his services to a program. Find funding for, or go yourself to an instructors course for handicapped riding. Trained instructors are a requisite for a NARHA approved program. Put on a benefit horse show or conduct a Ride-a-thon to assist with funding for one of Virginia's existing programs. Best yet - organize a new program in your area.

All programs should strive to provide a therapeutic related and NARHA approved program for special riders. With a note of warning, I can assure you that organizing new programs cannot be accomplished without a maximum amount of involvement, but others have done it and so can you. I can assure you that the students are there waiting for you and the rewards are worth the effort!

To assist with or help financially support Virginia's programs , contact:

The Old Dominion School of Therapeutic Horsemanship
P.O. Box 104
Great Falls, VA 22066

Loudoun 4-H Riding for the Handicapped, Inc.
c/o Mrs. Winnie Peele
137 B South Catoctin Circle
Leesburg, Va 22075 (703-777-0373)

Orange County 4-H Riding for the Handicapped
c/o Mr. Randall Shank
P.O. Box 30
Orange, Va 22960 (703-672-1361)

Rehabilitation Center
Charlottesville, Va

Camp Virginia Jaycee
Blue Ridge, Va.

Camp Easter Seal
(Contact your local Easter Seal office)

Muscular Dystrophy Camp
c/o Mrs. Susan Stanford
Montresor Camp
Route 2 Box 33
Leesburg, Va 22075 (703-777-1425)

Stallion and Mare Management

by
Dr. Milton D. Kingsbury, D.V.M.
Woodside Equine Clinic
Ashland, Virginia

Now is the time to develop good habits of stallion and mare management to help prevent any future spread of Contagious Equine Metritis (CEM) and other breeding diseases. Good hygiene and ready compliance with current regulations set by federal and state veterinarians will help us to help ourselves and our industry.

No two mares or stallions should be washed with the same equipment. The more disposable items (cotton, tailbandages, etc.) the better. Mares and stallions should be washed carefully by knowledgeable personnel in the cleanest manner possible. Mild ivory soap (preferably cake because it floats) and cotton are the most satisfactory along with a suitable mild disinfectant in the water (follow your veterinarians recommendation as to disinfectant). Wash the most contaminated areas first and discard the cotton. It is acceptable to wash the vulva and then progress outward to the buttocks. Never the reverse as this would increase contamination of the vulva. Water from washing the anus should not be allowed to run down over the vulva for the same reason. Likewise the opening to the penis (urethra) should be the last part cleansed when washing a stallion. Prompt discarding of contaminated wash water is essential. Handlers should thoroughly cleanse hands and arms before contact with the genitalia of the next mare or stallion. The nuzzling by a teaser of an infected mare is also a possible method of infecting other mares.

Since the primary spread of CEM is by breeding and secondarily by unclean instruments and equipment the prevention becomes a matter for the breeder. One break in good hygiene with an infected mare or stallion could lead to an outbreak. The spread from an infected mare to a stallion who becomes infected and then infects many mares is rapid. The spread from an infected mare to all mares on the farm with poor cleansing techniques is equally rapid.

Clinical signs are readily apparent in most infected mares 48 hours or so after introduction of the infective organism with breeding. The tail becomes matted with discharge from the vulva. However, infection in the stallion is less apparent as the male appears to play a "Carrier" role in the disease. This disease is not limited to one breed, current crossbreeding practices make this a problem for all breeds.

Suspect the disease when many mares bred to the same stallion return to estrus early or a thick mucous discharge occurs two to five days after breeding. (Some uninfected mares will discharge after several days of repeated breeding).

Mares in foal may harbor the organism hidden away in the urethra (the bladder drain) or the clitoris and deliver a normal foal only to infect a stallion when she is bred back. Thus we can see that the organisms best friend and our worst enemy is our complacency.

CEM infected animals are treatable, but only proper management can prevent its spread. It has been reported that the disease does not pose a problem for the future provided all precautions are taken.

Normal culturing of mares will not detect the organism because with that technique only bacteria which survive in the presence of air (aerobic) will grow on the culture plates routinely used. The culture sample must be taken, transported, plated and grown under special air free (anaerobic) conditions. The CEM bacteria is a anaerobic bacteria primarily and in nature finds the vagina and uterus, clitoris, urethra of the mare and the penis of the stallion suitable enviorments in which to grow. To be technically correct the bacteria is micro aeraphyllic which means it "likes a little bit of air".

The organism which appears to be easily cultured and relatively easily treated, is equally as easily spread.. (highly contagious). Fortunately it is also easily prevented and the prevention lies entirely in the hands of management.

The primary control of this disease is total cooperation with Federal, State and local veterinarians who are the surveillance force. The backup or secondary control is in the hands of every person who uses a tail bandage or washes a mare or stallion, or who handles a teaser.

There are other more formidable diseases which could be spread from abroad into our industry. Control of these also means total cooperation with our regulatory officials.

There is no logical reason at this time to test every mare and stallion. (NO PANIC) Regulatory officials have accurate lists of previously infected and exposed mares. This makes it necessary to screen or test only those animals who have been in contact with mares and stallions on the list. However, since even a teaser or test mare could be implicated in the spread of the disease, we owe it to our industry to observe and report suspicious clinical signs in our horses. Your own veterinarians should be contacted for advice on possible suspects and on management programs to help keep Virginias breeding industry (all breeds) free from the effects of CEM.

EXTENSION HORSE PROGRAM

by
Dr. Arden N. Huff

The horse industry plan of work including problem identification, program implementation and program evaluation is designed by the state specialist planning in cooperation with Extension program leaders, Extension field staff, the Virginia Horse Council and the fourteen member breed and show associations, the state 4-H horse project advisory committee and other state organizations and related industry groups.

The gross value of the Horse Industry in Virginia amounted to $171,000,000 in 1977. The industry is a major agricultural industry expanding at a rapid rate and includes 75,000 owners, 130,000 horses, 22,000 employees, 7,500 breeding farms, 500,000 spectators, and 10,000 4-H horse project members. The horse is assuming a significant role in the economy of the state.

Virginia has great potentials but also faces many challenges toward development in the areas of breeder incentives, marketing, sales facilities, communication, organization, increasing production costs, zoning, land-use, trail development, research, indoor show facilities, taxation, health, labor, nutrition, reproductive efficiency, management, facilities, import-export facilities, waste management, safety and knowledge base of owners, personnel and youth. A broad based educational program is required to enhance the economic development of this industry.

The VPI&SU Extension Horse Program is expanding at a rapid rate and may be divided into two areas: adult work and the 4-H youth program. The educational program focuses on problem solving work in cooperation with the horsemen across the state. The bulk of the program is conducted by Extension Agents located in all counties in cooperation with adult volunteer leaders. The state program, originating from field problems, is built around an interdisciplinary team involving the Animal Science, Agronomy, Agricultural Engineering, Architecture, Veterinary Science, Entomology, Agriculture Economics Departments and the State 4-H Club Staff.

The adult program goes hand-in-hand with the youth program and involves a continuous role in routine problem solving situations on a request basis such as nutritional problems, constructing facilities, etc. The Extension program has included five horse science schools across the state per year (one night per school for ten weeks) in 1974-1976. Approximately 600 horsemen enrolled in this program each year. For the past two years, a three-day short course was held at VPI&SU in lieu of the schools and drew 300 horsemen for an intensive program. The state team has also developed a sizeable literature package pertaining to nutrition, facilities, parasites and management. Several publications have received national acclaim. Other work includes media programs, cooperative programs with schools, tours, apprentice programs, shows, events and field days. VPI&SU publishes a monthly Horse Facts newsletter to 10,000 horse owners across the state. The newsletter features research reports and management information.

Educational work with industry groups includes a monthly newsletter, news articles, and programs on a request basis. The National Horsemen's Seminar is co-sponsored by VPI&SU and the industry and draws well over 600 participants each year from most states and many nations. The seminar proceedings provide Virginia horsemen with the most current and valuable information that is available.

Expansion is the tone of the educational program with 443 man days reported from the state Extension planning unit and 26,063 horsemen and horsewomen provided direct educational assistance in 1977. This should be compared to the 1973 year with 231 man days servicing 7,700 clientele.

Extension has reacted rapidly to provide horse owners with educational programs about drought assistance and emergency feeding and management programs. The industry was hard hit during 1976 and 1977 in most areas of the state and the effect will be of a long-term nature.

Extension and VHC has assembled a catalog listing of 25 VPI&SU staff and 100 volunteer horsemen and horsewomen to offer an expansive self-help educational base across the state for classes, seminars, and short courses on a long term basis. Local programs will be arranged for by the County Extension Agents.

Extension working with industry has assembled an educational package about land-use, trail development, zoning and ordinances. These are major areas of concern for horse owners in all areas of the state.

The Virginia 4-H horse program continues to expand in enrollment and number and quality of educational programs. Over 10,000 youths are enrolled in the program which is conducted by the VPI&SU Extension Service. Program leadership is given by Extension Agents in counties and cities and is coordinated by VPI&SU Extension Specialists. The program is conducted by hundreds of dedicated volunteer leaders and is supported by the horse industry across the state.

Emphasis is on the local project group for educational programs. The educational emphasis is on learning, horse science, horsemanship, career guidance, youth development and leadership. Thousands of meetings, clinics, shows, rides, and educational programs are conducted at the local, county, and district level. The program is designed to focus on the needs and interest of each member and his horse.

Project work is the basis for the individual's program. Members may enter into the progressive riding series (basic, novice, horseman, and horsemaster) and advance as far as his need and interest will take him. Members may also elect to take other projects, including mare and foal, horse business and self-determined.

A wide series of educational events and programs is open to the members. Some of these include demonstrations and achievement records, two district camps, state youth horsemanship school, several breed field days and judging contests, a state horse bowl (quiz program) contest, a state 4-H packing trip, a state 4-H competitive trail ride, a state 4-H trail ride, a state combined training event, and a show program. During 1977, 1500 youth participated in these events and over 300 volunteers assisted in the management of the state events. The program is all-breed oriented and is designed to use the horse as a tool for youth development.

The 4-H horse project enrollment has rapidly increased: 1966--3000 members; 1970--5100 members; 1974--6800 members; 1975--8500 members; 1977--10,000 members. Evaluations and participation in educational events indicate a very active and productive program which is developed by the inputs of need and interest by citizens in all areas of the state. In national competition in recent years, Virginia has fielded three national champion judging teams, two national achievement winners and two regional demonstration winners. These winners bring great credit to the Commonwealth and, in turn, provide educational training for hundreds of youth across the state.

Extension education programs have greatly enhanced the expansion of a native agricultural industry and in turn contributed to the overall economic growth of the state. The state planning team from 1973 to 1978 provided direct contact educational assistance to an accumulated total of over 108,000 Virginia citizens.

VIRGINIA
HORSE BOWL CONTEST
RULES AND REGULATIONS

By: Dr. Arden N. Huff

The objectives for this activity are to stimulate learning and reward youth for the knowledge they have gained concerning horses. This contest provides competition among youth in fairness and a friendly atmosphere. Remember, always be good sports.

I. Eligibility & General Guidelines

1. Each contestant must be a bonafide 4-H Club Horse Project Member in Virginia.

2. Eligibility for contestants must be met for the Virginia 4-H Recognition and Awards Handbook and is the responsibility at all levels of the respective Extension Agent. The horse bowl is considered as a demonstration and members must meet the eligibility requirements for demonstrations. The winning state team must also meet specific rules from the NE regional contest for participation. If such members do not meet the NE Regulations the team may select additional members from the county (If a member is ineligible, he has agreed upon entry to accept such a decision).

3. Each county or unit will be eligible to enter one junior and one senior team in the district contest. The top senior team in each district will compete in the finals during 4-H Club Congress. Thus, six senior teams (total of 30 contestants) will be eligible for state and will receive quota to Club Congress. Any scholarships must be arranged for at the local level. Substitution of team members from district to state is not permitted.

4. All members of a junior team may not be older than 14 as of January 1 of the current year. All members of a senior team must have reached their 14th birthday but not their 19th birthday prior to January 1 of the current year.

5. The State Winning Senior Team will be eligible to represent Virginia in the National Championship competition. (All training, travel and finance to be arranged for at local level).

6. Members of the Senior winning Horse Bowl Team will be ineligible to compete on future county teams.

7. Units should encourage all 4-H horse members to study and compete for the unit teams on an open participation basis. Unit team members may be selected by elimination contests or by any method acceptable and designated by leaders and approved by the Extension Unit.

8. All procedures, contests, contest questions and decisions for unit contests and district contests are final for that level of conduct. Unit or local contests to be arranged for entirely by the local level and the district contests likewise to be arranged for entirely by the district level at the direction of the district 4-H Program Leader.

II. Officials

A. Moderator (Quiz Master) - the moderator assumes complete direction of all contests, asks all questions, designates contestants to answer questions, accepts or rejects all answers unless overruled by both referee judges, but may seek interpretation of questions and answers from referee judges. The moderator designates the start of total time, the start and stop of time-outs, the winner of each contest, and shall at all times be in charge, with the final voice in all decisions, except for answers to questions which are ruled on unanimously by referee judges.

B. Referee judges - two judges are to be used, one may be a veterinarian, the other a knowledgeable horseman, preferably with a strong background in management, training, nutrition, physiology or showing. The referee judges will decide the acceptability or rejection of any question and/or answer when challenged by a team captain or team coaches. One judge may be used for local and county contests.

C. Time keepers - one or two individuals will be used to record total elapsed time for each contest and to indicate to the moderator the expiration of total time or the expiration of the time allowed in which to answer questions (it is recommended that two stop watches be available). The time keeper is responsible for the "Official" time.

D. Score keepers - two individuals shall keep scores on each contest. One written in such a manner that all points awarded or taken away in penalties may be checked, and one to maintain scores visible to the moderator, the contestants and insofar as possible the viewing audience.

III. Equipment

A. Panels - two inter-connecting panels, each to accommodate four (4) contestants plus a moderator panel with suitable controls.

B. Time recorders - two stop watches or other form of elapsed time recorders with stop/start (time-out) capabilities are needed, one to have at least a 20-minute range, the other with fractions of seconds accuracy.

C. Whistle - this signal device will be used by timekeepers (this may be a buzzer with a distinctly different sound than contestant buzzers).

D. Score keeping device - this may be a blackboard, a flip chart or electronic light display system which will score for both teams in multiples of five.

E. All equipment and questions for local county and district contests to be arranged for at that level. Panels are not necessary and not feasible for all contests. Contestants may use a show of hands, ring a bell, etc. if clearly explained by the moderator. Henceforth, in these rules the term "contestant activates a buzzer" is synonymous with a show of hand or ring of bell, etc.

IV. Teams

A. Each team shall consist of four (4) contestants and an alternate.

1. The alternate may not be seated at the panel or participate in the questions and answers, unless the moderator deems it impossible for one of the regular team members to continue the contest.

2. If an alternate is seated, following the removal of a regular contestant, the team member removed becomes alternate, but becomes ineligible to return to the contest.

3. The alternate, if not used as a competing member of the contest, shall be considered eligible for future contests.

V. Procedure of Play

A. Order of Team Play

1. Order of teams will be drawn at random. A bye system will be used during the first round if an odd number of teams enter. Successive rounds must have an even number of teams. The highest losing team(s) will be used in fulfilling the brackets. Each team will be assigned a slot in the playoff bracket before games begin. Team members and coaches are not allowed in the room during the contest until in their round of competition. Winning teams must likewise leave the room until their next round.

2. The same choice of question packets will be used for all teams in each round. It is therefore necessary that no one consult with teams who have not competed if they have heard the questions being used. Questions discarded due to lack of validity will not be repeated for the next game.

B. Starting the Contest

1. Two teams are assembled and seated at their respective panels.

2. A team captain is designated and shall be seated nearest the moderator.

3. The question packet is opened by the moderator.

4. At the signal of the moderator or as the first question is started, time begins.

5. The moderator reads the first toss-up question (as with all succeeding questions) until the completion of the reading of the question, or until a contestant activates a buzzer.

   a. If a buzzer is activated during the reading of any question, the moderator immediately will cease reading the question and the contestant activating the buzzer shall have five seconds to begin their answer based on that portion of the question read. The answer given must correctly answer the complete written question.

   b. If the answer given is incorrect, the question will not be repeated for the other team, but will be discarded as if it had been read completely and answered incorrectly.

6. At the completion of the reading of a question or when a buzzer is activated, five (5) seconds are permitted in which to begin an answer.

   a. Any member of either team is allowed to activate the buzzer and attempt to answer the questions.

   b. It shall be the responsibility of the moderator to determing if an actual answer is started within this five second period.

7. If the time in which to answer a question elapses without a contestant activating a buzzer, the question is discarded.

   a. There shall be no loss of points if neither team attempts to answer the question by activating the buzzer.

   b. If a bonus question was attached to an unanswered toss-up question, the bonus question is then transferred to the next toss-up question to which no bonus is attached.

8. If the answer to a toss-up question has begun during the five-second allowable time, but the answer is incorrect, that team loses five points.

   a. If a team activates a buzzer and an answer has not been started within the five seconds allowable time, there will be a five-point penalty to the team activating the buzzer.

b. If a bonus question is attached to an incorrectly answered toss-up question, the bonus question is transferred to the next possible toss-up question to which no bonus question is attached.

9. If the toss-up question is answered correctly within the five-second time limit, that team scores five points.

   a. If a bonus question is attached to the correctly answered toss-up question the moderator then reads the bonus question and a ten-second period is permitted for team consultation to determine the answer. The end of the ten-second period is signaled by the timer. At the signal from the timer, a five-second period is then permitted for the team captain or his designee to begin the answer.

   b. Successful completion of the answer increases that team's score by five points.

   c. Failure to answer a bonus question results in no penalty (loss of points) to the team.

10. There will be no consultation among teams nor will there be any coaching permitted by team members on toss-up questions. Failure to follow this rule will result in a five (5) point penalty to the team committing the offense plus an automatic incorrect answer for that question.

    a. Team members will be allowed to consult for ten-seconds prior to answering a bonus question. Coaches may not consult on any question.

11. Either team captain or the moderator may call for a time out for clarification of a rule, to permit the alternate to participate, or to allow for unexpected problems. Time outs may be called only after a question has been answered and before the start of the next toss-up question. In general, there should be no time out in any game unless called by the moderator.

C. Completing a Contest

1. The moderator will continue reading toss-up and bonus questions until signaled by the time keeper that the fifteen (15)-minute period of play has expired or until all 30 toss-up questions and their accompanying bonus questions have been asked, whichever comes first.

   a. If the moderator has completed asking the question at the signal of expiration of the fifteen-munute period and a team activates a buzzer within the five-second period allowed, the team activating the buzzer will be permitted to answer the question and if successful, points will be scored.

(1) Loss of points will also be counted for incorrect answers as described in (a).

b. If the time expires while a toss-up question is being read, the moderator will continue reading the question and both teams have a five-second period in which to activate their buzzers for an opportunity to answer the question.

c. If the time expires after the successful answering of a toss-up question to which a bonus question has been attached, the moderator may read the bonus question and the team having the opportunity to answer the question will be allowed their full ten-second consultation time and five-second time to begin the answer. All points gained from such bonus questions will be added to the score.

2. Following the final question, the scores of the two score keepers will be computed. If there is disagreement as to the score of the game, the referee judges will determine which score shall be used.

3. If both teams are tied at the end of regulation time, the moderator will read a series of five (5) additional toss-up questions until the tie is broken.

4. Once the moderator has declared a winner and the number of points, there shall be no protest.

5. There shall be no protest of any questions or answers following the declaration of the winner.

a. Any protests of questions or answers to questions may be made either by one of the team captains or the coach of either team at the time a particular question is read or answers indicated. There will be only one coach recognized for each team. When a question or protest is raised, time shall be called. The moderator and the referee judges will consider the protest. Their decision in all cases is final.

b. If a protest is sustained the moderator will take one of the following actions as he deems appropriate:

1. A question is protested before an answer <u>is</u> given and <u>the protest</u> is upheld -- discard the question with no penalty to either team.

2. An answer is protested (either correct or incorrect) - at least one of the referee judges and the moderator or both referee judges determine validity of protest - points will be added or subtracted as appropriate.

3. A question is protested after an answer is given

(correct or incorrect) - at least one referee and the moderator or both referees determine validity of protest of question. The question may be discarded at no loss of points. If question is allowed, the gain or loss of points will then be determined in the same manner as 2 above.

c. Abuse of protest provisions shall subject a team to the following:

1. Dismissal of team coach from contest area.
2. Dismissal (or replacement) of team captain.
3. Dismissal of entire team with forfeiture of contest.

d. All decisions at the contest are final and non-protestable and everyone involved so agrees upon entry.

6. Coaches should note that for the state contest no team of less than four members will be seated. Substitution from district to state is not permitted; therefore, teams are encouraged to enter five members in all senior district contests.

VI. Procedures For Use Of Standard Brackets For 4-H Horse Bowl Competition

12 TEAMS--(See diagram for game & round numbers)
- Round I - all teams compete (Games 1 through 6)
- Round II - all winners of Round I games compete (Games 7 through 9)
- Round III - winners of Games 7 and 8 compete in Game 10
  - winner of Game 9 plays highest point loser of Games 7, 8, 9 in Game 11. (In case of a tie for high point loser, Round I scores will be considered; if still tied, a short (5-10 minute) oral tie breaker game will precede Game 11.)
- Round IV - Winner of Game 10 to play winner of Game 11 for championship. Scores of Round III games will be used to determine third and fourth place teams. No further alignment or placing will be used.

11 TEAMS--Played as with 12 teams except:
- Round I - one of the teams in Game 2 will draw a bye and advance to Round II
- Round II - as with 12 teams
- Round III - as with 12 teams (if tie occurs for high point non-winner of Round II with team to draw a bye in Round I, the team which competed in Round I would be selected for Round III play.)
- Round IV - as with 12 teams

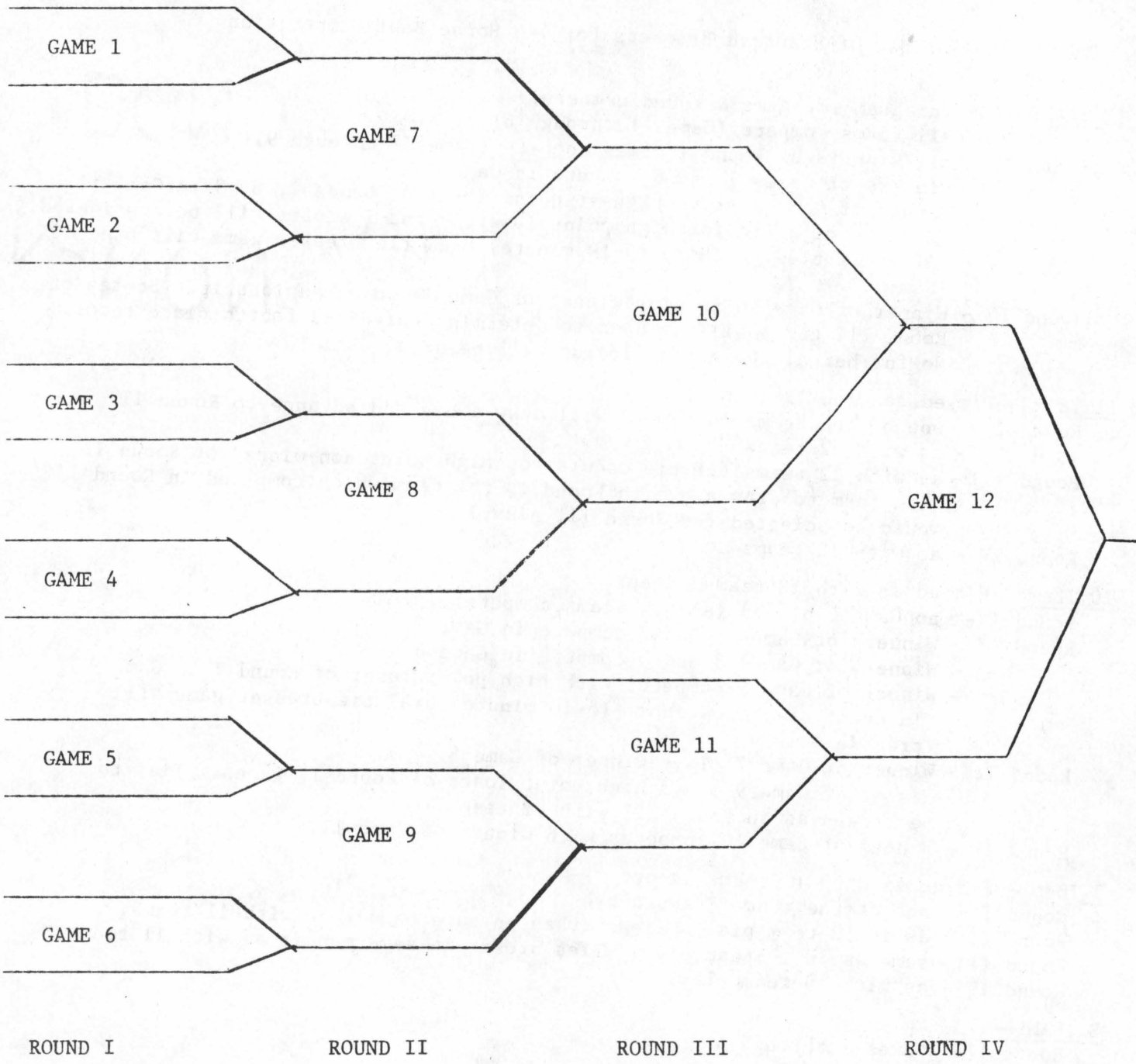
10 TEAMS--Played as with 12 teams except:
- Round I - no Game 6 played (all 10 teams compete)
- Round II - Winners of Games 1 and 2 compete in Game 7
  - Winners of Games 3 and 4 compete in Game 8
  - Winner of Game 5 competes with high point loser of Round I in Game 9 (In event of tie, a short (5-10 minute) oral tie breaker game will precede Game 9)
- Round III - Winner of Game 7 plays winner of Game 8
  - Winner of Game 9 plays high point loser of Round II games. Ties to be broken as in Round III with 12 teams.
- Round IV - Winner of Game 10 competes with winner of Game 11.

9 TEAMS--Played as with 10 teams except:
- Round I - one of the teams draws a bye
- Round II - as in 10-team play. Ties broken in same manner as with 11 teams.
- Round III - same as in 10-team play. Ties broken in same manner as with 11 teams.
- Round IV - as with 10-team play.

8 TEAMS--
- Round I - Games 1 through 4
- Round II - Game 7 and 8
- Round III - Game 10

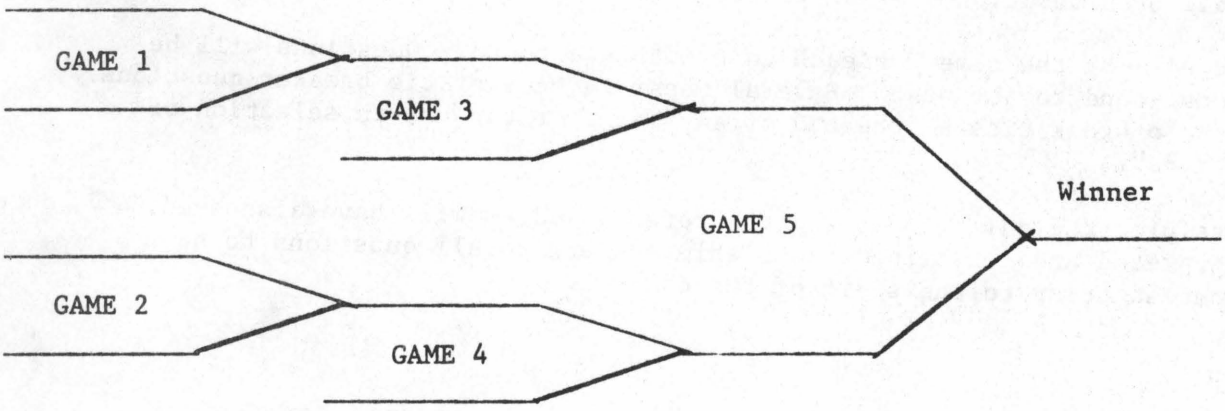
7 TEAMS--Played as with 8 teams except:
- Round I - one team draws a bye and advances directly to Round II play
- Round II - as with 8 teams
- Round III - as with 8 teams

6 TEAMS--Played as with 8 teams except:
- Round I - one team in Game 1 draws a bye and one team in Game 3 draws a bye
- Round II - winner of Game 2 plays team gaining bye in Game 1
  - winner of Game 4 plays team gaining a bye in Game 3
- Round III - as with 8 teams



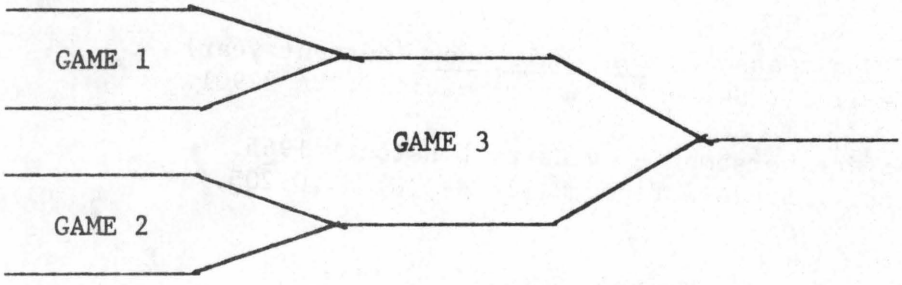
STANDARD BRACKETS FOR 8-12 TEAMS. If more than 12 teams, byes would be used in conjunction with "high point losers" to provide teams for Round II and Round III games.

5 TEAMS--Played with the following bracket:



Round I - Games 1 and 2 (5th team advances to Round II)
Round II - winner of Game 1 competes with 5th team in Game 3
- winner of Game 2 competes with high score loser of Games 1 and 2 in Game 4
Round III - winner of Game 3 competes with winner of Game 4

4 TEAMS--Played with the following bracket:



Round I - Games 1 and 2
Round II - winners advance to Game 3
- loser may also compete for 3rd and 4th in a Game 4 which should precede Game 3

3 TEAMS--Played as with 4 teams except:
Round I - a bye in Game 1. There would be no need for a "loser bracket", third place being automatic.

Team positions will be determined by the contest officials, utilizing a random drawing with all byes positioned prior to drawing.

Questions used will be the same for each game within a round. Questions will be changed from one round to the next. Several separate sets of tie breaker questions will be on hand to break ties at the end of any game, or for use in selection of "high point losers".

Insofar as possible, the quiz master and the referee judges will have discussed, modified, interpreted and determined acceptable answers to all questions to be used in the contest prior to the start of the contest.

VII. Questions

A. Questions will be limited only to direct simple answers direct only from the following publications: (Questions for junior contestants will be taken only from 1, 2&3).

1. Horses and Horsemanship - 4-H Horse Program. 1973. Extension Agent may order from A. N. Huff, Agnew Hall, VPI&SU, Blacksburg, VA 24061. (.30¢)

2. Horse Science - 4-H Horse Program. 1973. Extension Agent may order from A. N. Huff, Agnew Hall, VPI&SU, Blacksburg, VA 24061. (.30¢)

3. Breeding and Raising Horses. USDA Ag. Handbook, No. 394, Washington, D. C. 20402. ($1.25)

4. The Virginia Horse Shows Association, Rule Book (current year). VHSA, 1290 Seminole Trail, Suite 2, Charlottesville, VA 22901.

5. Handbook for the Novice Horseman - by Harry Disston. 1965. Eiser, Inc., 1304 North Broad Street, Hillside, N. J. 07205. ($4.95)

6. The Horse - by Evans, Borton, Hintz & VanVleck. 1977. W. H. Freeman and Co., San Francisco, CA. ($25.00)

B. All questions must be typed as follows on a 3X5 card:

Horses & Horsemanship - 4-H

Q. What is the characteristic gait of the Tennessee Walking Horse?

A. Running Walk

p. - 17

The card must list source (Horses & Horsemanship), question in question form, specific answer per reference, and page number from the reference.

C. In reading the question, the moderator should first say "toss-up" "Horses & Horsemanship" and then the question.

D. Questions should be designed for simple, brief answers. Where ranges are involved, one answer within the range is acceptable. Questions should be simple, direct and not related to some trivial or highly questionable matter - such as people's names, addresses, etc. New questions should be used for each successive contest or from year to year. Questions may also be based on true or false basis.

E. When answers are protested, the judges may refer to the reference page number as final or rule according to their best knowledge. Judges may in some necessary cases overrule the reference.

F. Locating the reference material is entirely up to the local team. The text books are not available from VPI & SU but may be purchased if so wished direct from the publisher. Questions may be referenced only from the above published list and must come from within any book and any place of the book on the list; therefore, a wide range of subject matter area may be included in any question pack. Junior team questions may come only from references 1, 2 and/or 3.

G. Units are encouraged (leaders and members) to submit questions (typed on cards) they have designed for the contests. District contest chairmen will give necessary instructions for this. For state contest each unit is encouraged to prepare

(per B) ten questions and have their Extension Agent mail these questions to the Extension Horse Specialist, Agnew Hall, VPI & SU, Blacksburg, Va. 24061 by June 1st of contest year. One of the ten may include a bonus question, example:

> Horse Science - 4-H
>
> Q. What are the slender teeth in front used for biting grass, etc. called?
>
> A. Incisor(s) p. 15
>
> Bonus
>
> Q. How many sperm may fertilize one egg?
>
> A. One p. 19

H. After all questions have been assembled, reviewed and duplication removed, (contest chairmen may add questions from the references) the questions will be shuffled and assigned at random to packs of 30 (the 30 should include at least 5 and not more than 10 bonus questions). All questions in the pack will be shuffled and stacked at random.

I. Contests must plan in advance for one pack of 30 per round plus a few packs to use in case of ties. Twelve teams would require a minimum of four packs. The same pack will be used for all teams in each round. New packs will be used for each new round.

VIII. Entry

District contest chairmen will advise units about procedures for entry in district contest. State Senior contest entries (one team per district, 5 members per team) must be made on Ext. Form 78 and sent to the Extension Horse Specialist, Agnew Hall, VPI & SU, Blacksburg, Va. 24061 by June 1 of contest year.

IX. Awards

Local & district - Arranged for by local or district (No junior contest beyond district)

1st Place Sr. Team District - Quota to Club Congress & Entry In State Contest

State - Ribbons to Four High teams, Trophy to High Team - First Place Team eligible to represent Virginia in out of state contests.

By: Dr. Arden N. Huff

COOPERATIVE EXTENSION SERVICE

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

DEPARTMENT OF ANIMAL SCIENCE

Blacksburg, Virginia 24061

December 20, 1978

TO: Extension Unit Chairpersons

RE: Virginia Horse Census

Dear Co-Workers:

Please find enclosed per unit ten copies of Survey Forms I - V for each unit to conduct a thorough census and economic analysis of the total equine industry located within confines of all county and city Extension units.

We would like to ask each unit to do the survey and send one copy of the completed results to me by May 1, 1979. After which, we will compile and publish a state summary. Each unit survey will be needed in order to compile a useful state summary. I know that this is asking for a lot but it is needed and Extension can get it done. This will provide benchmarks for your county Extension programs.

The survey was requested by our Program Leaders, Agriculture and several units, subsequently requested by the Virginia Horse Council, and approved by appropriate authority. The forms have been carefully reviewed by many people at all levels in Extension, industry and other agencies. This will be of much value for your unit and state staff to plan and implement educational programs and for our industry to define and establish benchmarks for development and progress. Unlike all other agricultural industries, the horse industry is not provided with a census and no group or agency has such a priority. Extension is a can-do outfit and with cooperative work with industry, 4-H leaders and members, and other agencies and groups, we can all combine our efforts to get the job done. Please keep your program leader involved in this process.

Steps and Guidelines

1. Advise all staff about the survey.

2. Establish a committee of volunteers (15 to 25 people) to do the census and survey - chairperson, etc. This should include knowledgeable people from all areas of your unit that will provide the knowledge base and work to completion. Include horsemen, 4-H leaders, 4-H members, other resource people. This can be a local program development committee.

3. Inform the public about needs, plans, goals, etc. via media. Be sure to stress that it is confidential for any individual inputs and is not tax collecting related.

4. Organize and do the actual count first, but keep notes, etc. on other parts as work on Part I progresses. For actual count, the committee could establish a network of other volunteers to cover the unit--each small local group taking a specific block from a master map - between such and such road, river, etc. - and then count all the equines in each small section to combine later for a unit total. On site count is not necessary in all cases but in general is recommended. On site should be with prior approvals. Request additional copies of Part I for field team use. Cards are also enclosed for team use and you may request this condensed form.

5. Parts II - V

   Some items can be counted in committee. Others will have to be estimated. Ask your farm management agents to help the committee with several items.

6. At the end - Compile and publish a county or unit summary to your clientele, media, etc., keep a good copy on file, and send one finished copy to me.

In the process, you will be able to have people involvement in Extension program planning and, thus, obtain benchmarks for statistical information on a very large agricultural industry and for educational needs and programs. You will have expanded contacts, mailing lists, etc.

Thanking you, I am

Sincerely,

Arden N. Huff

Arden N. Huff
Extension Specialist, Animal Science

bmc

Enclosures

cc: Program Leaders, Agriculture
Dr. M. F. Ellmore
Mr. Cecil McBride
Dr. Bill Brant
VHC Officers
Mr. Rudolf Doswell
Dr. Ken Bovard
Mr. John Ligon
Dr. Warren Mitchell
Dr. A. L. Eller, Jr.
Mr. James A. Sharp
Mr. John D. Marsh
Mr. Mike Hughes

PART I

ACTUAL COUNT OF HORSES,
PONIES, MULES AND DONKEYS
IN THE UNIT

UNIT (County or City) _____

A. LIGHT HORSES

Major Breed Type	Number	Number of Owners
1. American Saddle Horse		
2. American Quarter Horse		
3. Appaloosa		
4. Arabian		
5. Morgan		
6. Standardbred		
7. Tennessee Walking Horse		
8. Thoroughbred		
9. Crossbred or unknown		
10. Other (Specify)		
TOTAL NO. LIGHT HORSES		

B. PONIES

TOTAL NO. OF PONIES _____ _____

C. DRAFT HORSES

TOTAL NO. OF DRAFT HORSES _____ _____

D. MULES

TOTAL NO. OF MULES _____ _____

E. DONKEYS

TOTAL NO. OF DONKEYS _____ _____

F. GRAND TOTAL OF ALL EQUINES
(A + B + C + D + E) _____

G. TOTAL NUMBER OF OWNERS _____

PART II*

ESTIMATED INVESTMENT IN LAND, BUILDINGS, EQUIPMENT AND ANIMALS IN THE UNIT

A. ESTIMATED TOTAL NUMBER OF ACRES DEVOTED TO EQUINES AND EQUINE USE IN UNIT

Number of Acres _____

Value Per Acre $_____

Total Value of Land Investment (Acres X Value Per Acre) $_____

B. ESTIMATED GROSS VALUE OR INVESTMENT IN EQUIPMENT AND BUILDING FOR EQUINES IN THE UNIT $_____

C. ESTIMATED GROSS VALUE OR INVESTMENT IN HORSES (EQUINES) IN THE UNIT

Estimated Value of Each Animal $_____

X Total Number of Animals (I-F) _____

GROSS VALUE $_____

(May figure by breed and then combine)

D. TOTAL INVESTMENT IN LAND, BUILDINGS, EQUIPMENT AND ANIMALS IN THE UNIT (Total A, B and C) $_____

*Round to nearest dollar

PART III

ADDITIONAL PARTICIPANT DATA ON EQUINE AND EQUINE USE IN UNIT

Category	Number
1. Saddle Clubs	
Number	_____
Number of members	_____
2. Riding Hunt Clubs	
Number	_____
Number of members	_____
Total number of acres open to hunting rights	_____
3. Riding Schools	
Number	_____
Number of students (per year)	_____
Number of Instructors	_____
4. U.S. Pony Clubs	
Number	_____
Number of Members	_____
5. 4-H Club Horse Project Groups	
Number of Groups	_____
Number of Members	_____
Number of Leaders	_____
6. Prep School and Collegiate Equitation Units	
Number	_____
Number of Students (Per year)	_____
Number of Instructors	_____
7. Training Establishments	_____
8. Breeding Farms	
(5 or more head of mares)	_____
(1 or more stallions)	_____
9. Horse Sales Per Year	
Number of organized sales (In-state)	_____
Total number of head sold each year (In-state)	_____
Total number of head sold out of state in organized sales per year	_____
10. Racing (Per year)	
Number of organized Flat Race Meets	_____
Number of Hunt and Steeplechase Race Meets	_____
Number of Harness Race Meets	_____
Number of Horses In the Three Above	_____
Number of Horses on tracks outside of Virginia but Virginia-owned	_____
11. Establishments boarding and renting out horses	_____

PART III (Continued)

Category	Number
12. Stables and rings	
Number of stables (5 or more head)	_____
Number of standard size rings:	
Indoor	_____
Outdoor	_____
13. Riding Trails	
Number of miles - private	_____
Number of miles - public	_____
Number of organized rides (½ day or more) per year	_____
Total Number of Riders Involved in Trail Riding	_____
14. Horse Shows	
Number of Shows	_____
Number of participants	_____
Number of Spectators	_____
15. Tack and Equipment Sales	
Number of firms selling primarily horse items	_____
Number of firms selling between 25% to 50% of total sales in horse items	_____
16. Transportation	
Number of full-time horse transportation firms	_____
Number of firms selling trailers and vans	_____
17. Insurance	
Number of companies selling substantial horse associated insurance	_____
18. Feed	
Number of businesses selling horse feed	_____
19. Employment	
Number people employed by farms, schools & stables	_____
Number people employed by equine related industries (tack, feed, insurance, drug, transportation, etc.)	_____
20. Number of Farriers	_____
21. Number of Veterinarians (50% or more equine practice)	_____

PART IV

SUPPLY AND SERVICE ESTIMATES*

A. Estimated Annual Cost For Keeping A Horse In The Unit
(May estimate by breed and use an average)**
(Or estimate by breeding mares, stallions and pleasure horses and use an average)

Variable Costs (or Value) Kind	Per One Animal Amount (As Appropriate)	Cost or Value
Pasture		
Hay		
Grain		
Protein		
Salt & Minerals		
Veterinary		
Drug		
Farrier		
Show or Use Clothing		
Bedding		
Various Fees		
Stabling Charge		
Transportation		
Small Equipment Items		
Insurance		
Utilities		
Breeding Fees		
Misc.		
	SUBTOTAL	$

Fixed Costs (ask Farm Mgt. Agent for assistance)		
Depreciation (Buildings & Equipment)		
Interest on investment (Buildings & Horses)		
Taxes (Non-land)		
Insurance		
Labor (hours)		
	SUBTOTAL	$

B. TOTAL COST FOR KEEPING A HORSE
(Variable Costs + Fixed Costs) $

C. TOTAL PRODUCTION COSTS - SUPPLY AND SERVICE
FOR THE INDUSTRY IN THE UNIT
(IV, B X I-F) $

D. SUBTOTAL SUPPLY INPUTS - GROSS
Amount and Cost Per Animal X I-F

Item	Amount	Total ($)
Hay	_____ Tons	
Grain (Inc. Protein)	_____ Tons	
Salt & Minerals	X	
Veterinary	X	
Drug	X	
Farrier	X	
Labor	Total Farm Payrolls	

*Round to nearest dollar.
**Ask Farm Management Agent for assistance.

PART V*

GROSS INCOME ESTIMATES FOR UNIT
(Per head or other item X Total Items) (May do by breed and group and/or average)

GROSS FOR ALL EQUINES

Item	Number if Appropriate	Total Gross Dollars
Thoroughbred Yearlings Sold	_____	$_____
Young Horses of Other Breeds Sold	_____	$_____
Mature Horses Sold	_____	$_____
Training Income	X	$_____
Boarding Income	X	$_____
Riding Instruction	X	$_____
Thoroughbred Purse Earnings	X	$_____
Standardbred Purse Earnings	X	$_____
Renting Horses	X	$_____
Stallion Fees	X	$_____
Misc. Income (Prize money, etc.)	X	$_____
Salvage Value of Horses Sold for Meat	_____(No. Hd.)	$_____
	TOTAL INCOME	$_____

*Round to nearest dollar.

Field Work Card

PART I - ACTUAL COUNT OF HORSES, PONIES, MULES & DONKEYS

Farm or Farms _____ Map Area _____

Acres _____ Reporter _____

A. Light Horses Major Breed Type	Number	No. of Owners
1. American Saddle Horse		
2. American Quarter Horse		
3. Appaloosa		
4. Arabian		
5. Morgan		
6. Standardbred		
7. Tennessee Walking Horse		
8. Thoroughbred		
9. Crossbred or unknown		
10. Other (Specify)		
TOTAL NO. LIGHT HORSES		
B. TOTAL NUMBER OF PONIES		
C. TOTAL NUMBER OF DRAFT HORSES		
D. TOTAL NUMBER OF MULES		
E. TOTAL NUMBER OF DONKEYS		
F. GRAND TOTAL OF ALL EQUINES (A + B + C + D + E)		
G. TOTAL NUMBER OF OWNERS		

Sub-Items Part III

Category	Number
7. Training Establishments	
8. Breeding Farms	
(5 or more head of mares)	
(1 or more stallions)	
11. Establishments boarding and renting out horses	
12. Stables and rings	
Number of stables (5 or more head)	
Indoor	
Outdoor	
19. Employment	
Number people employed by farms, schools & stables	
Number people employed by equine related industries (tack, feed, insurance, drug, transportation, etc.)	

USE BACKSIDE FOR NOTES