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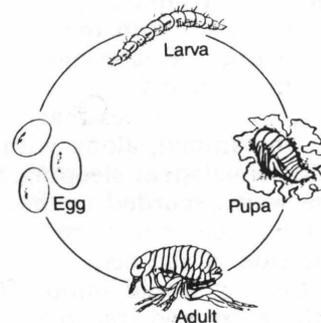


## INSECT NOTES

### HOUSEHOLD FLEA CONTROL

For the last several years my graduate students and I have been conducting research on the biology and habits of cat fleas in houses. Specifically, we have been investigating the location of flea larvae in carpeting, with the hope of better designing control strategies for this stage. We have published our research results in scientific and pest control industry trade journals. The data presented here is a condensed version of a recently published paper on the location of cat flea larvae in carpeting, with suggestions on control. I hope that this information will help Agents help homeowners with their cat flea problems.

The life stages of household infestations of the cat flea are located in two different habitats: on the pet, and in the carpeting. Adults spend the majority of their time feeding and mating on pet dogs and cats, and little time off the host. The immature stages--flea eggs and larvae--are primarily located in carpeting, on furniture covering, or in crevices in hardwood or vinyl flooring. Control of indoor infestations of the cat flea must include treatment of the pet--to eliminate as many adult fleas as possible--and it must include applying insecticides to the carpeting and furniture to eliminate the immature stages.



Knowledge of the location of the target pest--in this case the immature stages of the cat flea--can help the professional pest control operator and/or the homeowner in deciding on the best control procedures. Thorough insecticide coverage of household carpeting usually results in effective flea control. However, missing a one or two key locations in a house can result in limited or inadequate control--and frequent call-backs! The objective of the research reported here was to gather information on the habits and distribution of flea larvae in household carpeting.

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of flea infestations for 3-4 years. A small dog was the only pet in the house. Two rooms within the house, the family-room and a bedroom [only the bedroom will be reported on here], were selected as study sites based on the frequency of occupancy by the pet dog. The rooms were completely emptied of all furniture and other articles located on the carpeted floor. The carpeting in the room was marked with chalk into the 16 x 16 inch squares and each square was vacuumed for one minute (Eureka: model 1425 with a beater bar). A tight-weave muslin bag collected the sample of debris from the individual carpet squares. Each sample was carefully examined and the number and stage of eggs (hatched and unhatched), and the skins cast off by the flea larvae were counted and recorded.

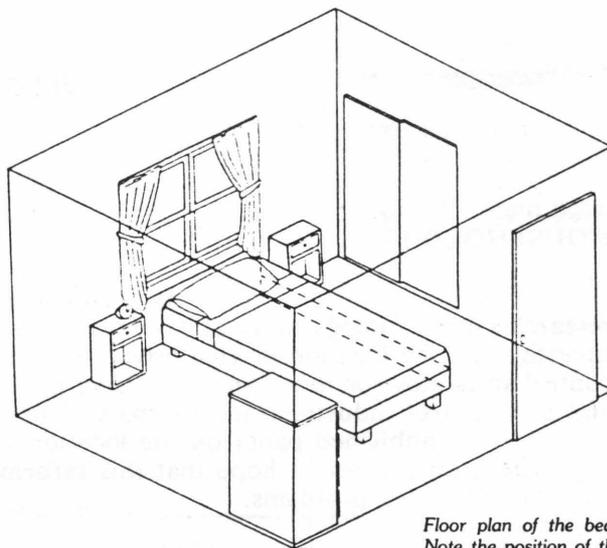
### RESULTS

*Habits of the Dog in the Bedroom.* The dog frequently spent the night sleeping at the end of the bed, and would often crawl under the bed to sleep.

*Hatched and Unhatched Eggs.* The large number of hatched eggs collected in this room is indicated by the large and small spikes on the surface map. There were many eggs in the carpet where the dog would have landed when jumping off the bed to the floor. And there were many eggs in the carpet leading from the bed to the door to the hallway. In the areas of the room that the dog did not frequent--the entire left side of the room--there were very few eggs collected.

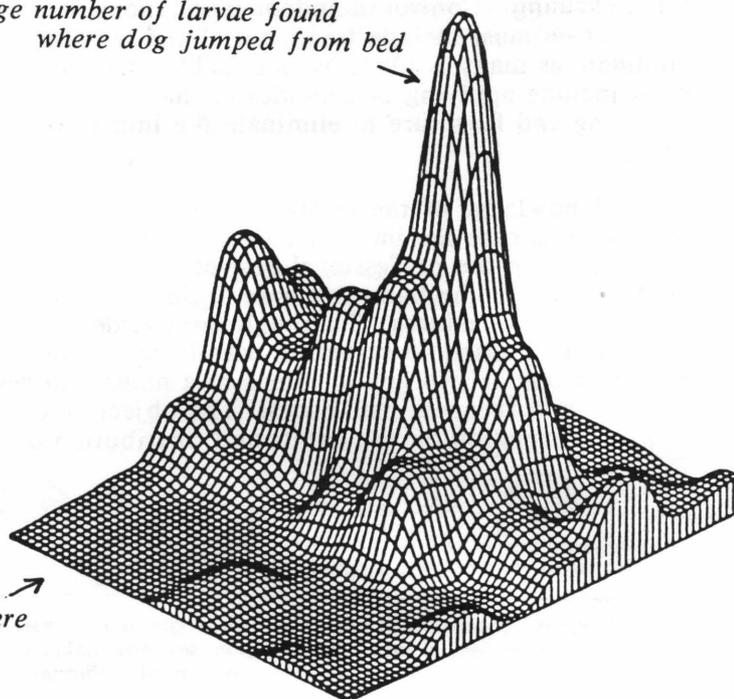
*Larvae.* The large spike indicating the number of first-stage larvae is closely associated with the location of hatched eggs. First-stage larvae were probably successful here because of the dried-blood feces that would fall off of the animal, along with the eggs, following time spent sleeping. First-stage larvae were recorded in the entire area under the bed, but more frequently on the side of the bed closest to where the dog would jump off to move out of the room and into the hallway.

The distribution of second-stage larvae was similar to that of the first-stage. However, there were some differences. Note the distinct spike in the corner of the room, behind the door. The spike indicates that approximately 50 larval cast skins collected there. This location may have provided the



Floor plan of the bedroom. Note the position of the bed and the door, the places where most flea larvae and eggs were found.

Large number of larvae found where dog jumped from bed



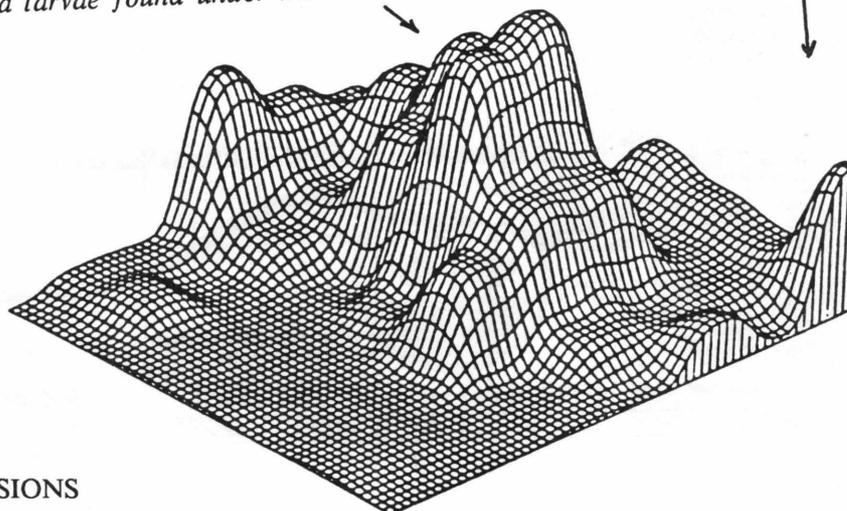
No larvae found here

larvae some protection from human traffic.

**Control Strategies.** A regular vacuuming of this room would add significantly to a chemical control program. A thorough cleaning of the carpet around and under the bed would remove some of the dried-blood feces that the larvae depend on for development. Chemical control would be best performed if all the furniture were removed from the room to allow access to the area beneath the bed. If this is not possible, the pest control technician or homeowner should carefully apply insecticide to the entire carpet, including under the bed and behind the door.

*Flea larvae found under the bed*

*Note the flea larvae found behind the door*



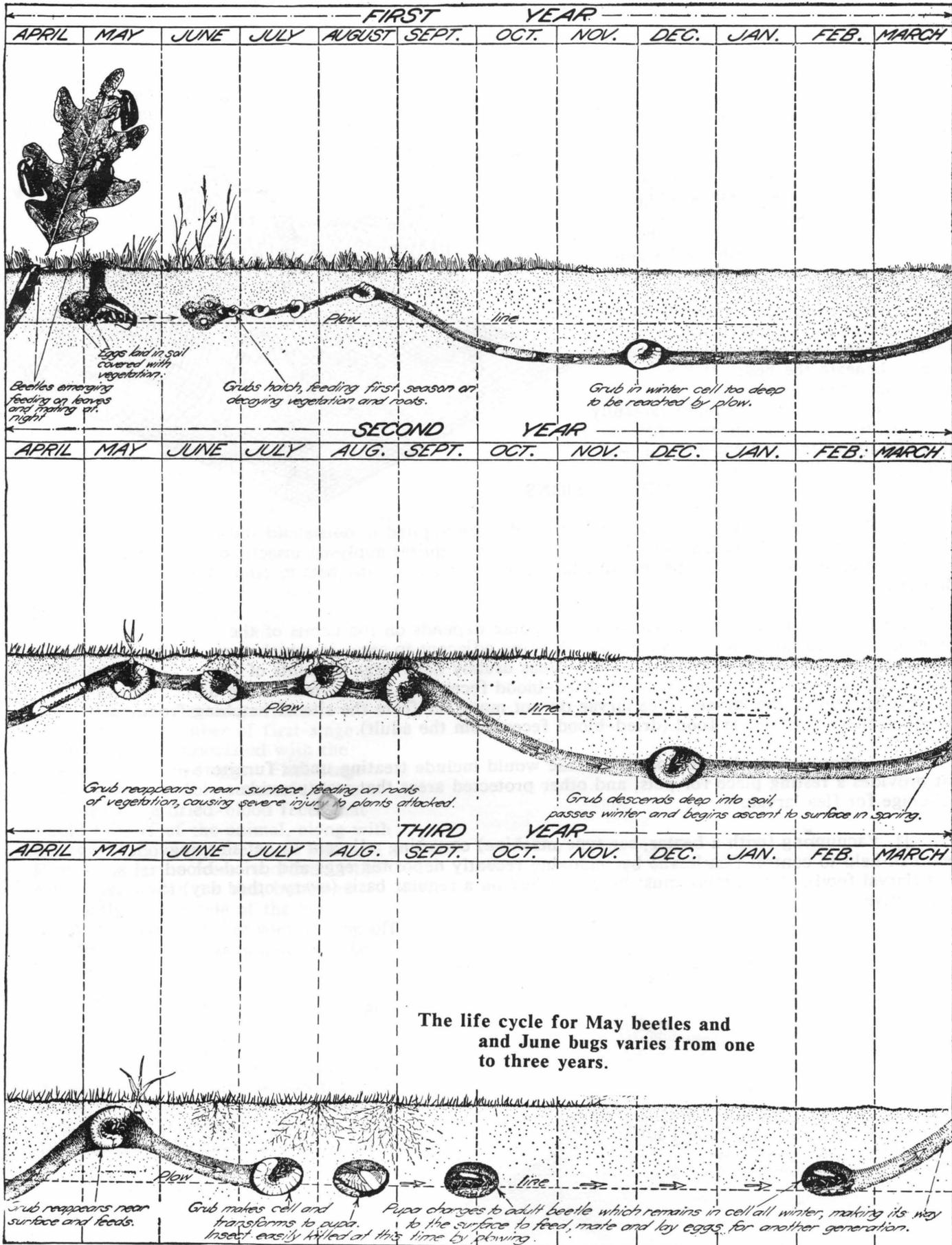
### CONCLUSIONS

[] Flea larvae are the target when insecticides are applied to household carpeting to control infestations. Successful flea control requires applying insecticides to kill the flea larvae in the carpeting, and adequate treatment of the pets to eliminate adult fleas.

[] The distribution of flea larvae in the house depends on the habits of the house pet(s). Flea larvae are found in the carpeting adjacent to areas in which the pet(s) spend time sleeping or resting. These areas usually have large amounts of flea eggs and larvae, and an accumulation of dried-blood feces that is important to the diet and development of the larvae. Flea larvae do not move far from the site of hatching from the egg if there is adequate food (dried-blood feces from the adult).

[] A thorough application of insecticide would include treating under furniture that provides a resting place for pets, and other protected areas that may provide harborage for flea larvae.

[] Vacuuming (with a beater-bar type machine) carpeting adjacent to pet sleeping areas can help to control flea larvae by removing recently deposited eggs and dried-blood feces (larval food). Vacuuming must be performed on a regular basis (every other day) to be effective.



Eggs laid in soil covered with vegetation.

Beetles emerging feeding on leaves and mating at night.

Grubs hatch, feeding first season on decaying vegetation and roots.

Grub in winter cell too deep to be reached by plow.

Grub reappears near surface feeding on roots of vegetation, causing severe injury to plants attacked.

Grub descends deep into soil, passes winter and begins ascent to surface in spring.

Grub reappears near surface and feeds.

Grub makes cell and transforms to pupa. Insect easily killed at this time by plowing.

Pupa changes to adult beetle which remains in cell all winter, making its way to the surface to feed, mate and lay eggs for another generation.