

Steve & Karen Galloway

Frederick, MD, 21703
Home Ph: (301) 473-4351

Northeast Region SARE Program
Attn: David Holm
10 Hills Building
University of Vermont
Burlington, VT 05405

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FINAL REPORT:

NER SARE Project FNE99-287

Ginseng Dead Heading

Interim Report for 1999

Period from April 1, 1999 to April 1, 2001

We find it necessary to end our grant study prematurely, without realizing results as we had hoped. This decision comes after consultations with our collaborator, Mr. Jonathan Kays and with Mr. David Holm the SARE Program Manager.

The reasons for ending the study are primarily because burrowing rodents, which have plagued the planting beds since 1999, have reached the beds containing the ginseng plants that were subjects of the "Dead Heading" study. My mole/ vole problem was first brought to SAREs' attention during a telephone discussion I had with Dr Gardiner in April 2000 and followed by the June 9, 2000 addendum to my interim report to SARE.

During visits to our project site in 1999 and 2000, Mr. Jonathan Kays, our collaborator, and I observed that some plants were shriveling due to underground burrowing by rodents. We took steps to combat the problem using a combination of traps, poison baits and spreading juicy fruit gum throughout the infested area. We discussed the situation with Dr. Gardiner, and were encouraged by him to develop some kind of mole fencing to install around the test beds. We installed mole fencing between the beds and the tree stump where the moles seemed to be concentrated. See Figure 1.

The mole fencing was effective in stopping mole tunneling. It involved digging a trench beside the length of each bed. We cut 8-inch wide strips of galvanized steel mesh from 4' x 8' sheet. The strips were placed into the trenches dug along side of the test beds. Then the trench was back filled thus creating a barrier between the stump and the test ginseng plantings. The trenches were dug approximately 6" to 8" deep to prevent rodents from burrowing beneath. The fencing prevented the rodents from burrowing into the beds from the direction of the stump.

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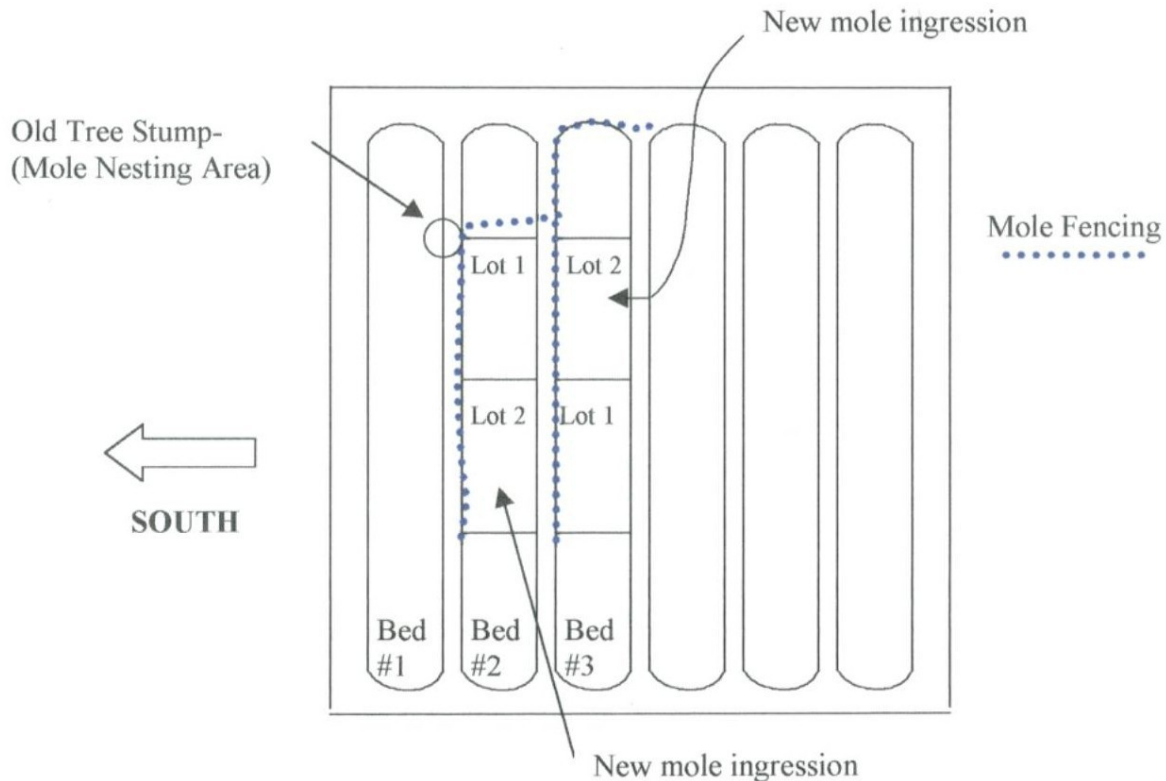


Figure 1, Planting Beds Diagram

We deadheaded (removed the flower clusters) from the ginseng plants in Bed 2, Lot 2 and Bed 3, Lot 2 in June 2000. In most cases the tiny white flowers had just begun to open which is the stage just before the berries begin to form. In August 2000, fully ripened, red berries were beginning to appear on the control plants in Bed 2, lot 1 and Bed 3, lot 1. The berries from the plants under study were picked when they ripened to red over the course of several weeks and kept in a separate container from the rest of the ginseng berries that we picked on our farm. The three year old control plants yielded 1/4 pound of seeds which after being stored for a year to stratify them, would be worth about \$15.00. (Ginseng seed must lie dormant for 18 months before it will sprout.)

Tunneling appeared again in February 2001 at the top and bottom perimeter of the beds. (I hadn't completely circled the beds with mole fencing so we were vulnerable to tunneling from the sides of the beds opposite from the stump.) I hastily assembled and deployed baited traps between the observed tunneling and the study beds. I caught several dozen moles between February and April 20 at which time the ginseng plants began to emerge.

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Despite deploying the baited traps, new damage was observed in the study beds. Each day I would find 3-4 dead plant stalks, which I removed from the beds. I tamped down the tunnels each day and repositioned the traps. Occasionally I caught moles and wood voles in the test beds but I wasn't catching as many once they reached the ginseng. It seemed that they preferred to eat the ginseng roots to the baits that I presented them. I was still catching moles and wood voles regularly in the traps around the outer perimeter of the beds. Out of nine deployed around the perimeter of the beds, an average of one trap per day would have a kill.

Over the summer of 2001, we lost approximately 200 plants, which were under study to tunneling rodents. Most of the plants were lost from bed #2, lot 2 and bed # 3, lot 2. These lots contain the study plants that were deflowered. Combined with the mole damage from the previous year, less than 50% of the deflowered plants remain leading me to conclude that further pursuit of the study would be unavailing. We believe that, our study to determine the effects of removing the seed clusters from American Ginseng plants has been compromised and that valid results cannot be demonstrated.

In the following paragraphs I'll share what I did learn about controlling mole and vole damage which should be useful to many. In February of 2001 we developed a method of trapping the underground burrowers, which has yielded astonishing numbers of moles and wood voles in our ginseng beds. We kept a record of how many critters were trapped in the approximately 2,500 sq. ft. under cultivation in this particular ginseng patch that contains the study beds. Between February 15, 2001 and Aug 31, 2001 we've trapped 51 moles, 5 deer mice and 14 wood voles. Although some got around our traps, all of the critters we did catch were munching or would have been munching the ginseng roots in these very beds.

An empty, 1 LB coffee can is used with a common Victor, snap trap style mousetrap inside. After baiting the trap, it is slid into the coffee can with the business end facing out. The tunneling of the rodents leaves a telltale mound about 2" high. Once established, a single tunnel can be used like a highway by many moles and voles. The loaded coffee can is positioned with the open end facing perpendicular to the path of a recent tunnel. An opening is made in the side of the tunnel mound with the index finger so as to let the aroma of the bait enter the tunnel cavity. The coffee can and the adjacent portion of the tunnel are then covered with an 18" x 18" rubber mat to create an environment underneath that's comfortable for moles and voles to investigate the bait. The traps are checked daily and re-deployed at the same tunnel openings when a rodent is caught. We would usually catch a series of moles or a series of voles from a single tunnel for about a week and then activity would die down.

We started using peanut butter as bait and then rotated baits between sweet onion, carrot and tuna fish. I observed that shortly after the ginseng plants had fully emerged, peanut butter was less effective for catching the burrowing rodents that had already made it into the ginseng beds. Theorizing that the ginseng roots were now sugaring, I switched to carrot and sweet onion and I began catching some moles and wood voles again. Both the

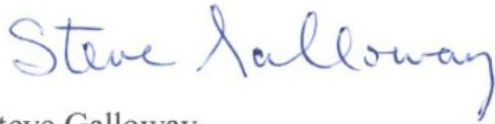
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moles and voles were attracted to the same baits as far as I could tell although I tried tuna fish a few times and caught only moles

Although I originally intended to learn about the effects of deadheading ginseng plants, I learned a lot about controlling burrowing rodents. Ultimately, I feel that the below ground mole fencing described in this report was the most effective way of controlling damage. My trapping techniques proved moderately effective however, once a trap is sprung on any given tunnel, the tunnel is open for use by the next rodents that follow until it gets re-baited. I intend to install mole fencing around the perimeters of all of our ginseng patches in the future. In conjunction with the fencing, I'll also use the trapping method described on localized tunneling that appears.

Sincerely,



Steve Galloway

Cc: Mr. Jonathan Kays
Dr. A. L. Hammett
Dr Janine Davis
Boone Sang Coop Association
Empire State Ginseng Growers Association
W. Scott Persons- Tuckasegee Valley Ginseng

Postscript:

I learned of a similar study that has already been conducted on removing the flower tops from ginseng plants. In September of 2000, I attended a conference sponsored by Cornell University, "American Ginseng Production In the 21st Century". Dr John T. A. Procter presented results of a study he conducted entitled "The Effects of Flower Removal on Growth of American Ginseng Roots" at the University of Guelph, Ontario Canada. His data supports that ginseng root growth is enhanced with the removal of the flower tops. For your information I have included a transcript of the workshop session copied from the conference proceedings that I received following the conference.