

## Nematodes May Provide Another Answer to DED

When an Agricultural Research Service nematologist examined shot-hole borers that had killed a peach tree, he found the insects, a species of bark beetle, to be parasitized by nematodes. Now, he is trying to manipulate these nematodes to attack the bark beetle that carries Dutch Elm Disease.

Dr. William B. Nickle hopes the elm bark beetle can be debilitated

or sterilized effectively with parasitic nematodes. He theorizes that, like another nematized insect, the face fly of cattle, these beetle populations might be reduced to a level where they would no longer be a major problem. The elm bark beetle has no nematode parasites at present.

In his initial studies, Dr. Nickle learned that the nematode parasites, *Neoparasitylenchus rugulosi*, affect the reproductive behavior of shot-hole borers and finally kill them.

Normally, a female shot-hole borer penetrates the bark of a fruit tree,

leaving a shot-size hole. She then makes a gallery about an inch long parallel to the tree stem and lays eggs on both sides of the gallery. After hatching, the new insect larvae mine out lateral tunnels from the sides of the gallery, forming a pattern resembling legs of a centipede. Heavy infestations, especially on trees weakened by drought, wind, or mechanical injury, rapidly kill fruit trees such as cherry, peach, pear, apple, and choke cherry.

However, Dr. Nickle learned that when the female beetle is parasitized by the nematode, she makes horizontal galleries and doesn't lay eggs. After she dies, hundreds of nematodes emerge from her head.

These emerging nematodes are fourth-age male and female larvae which molt, become adults, and mate within two or three days in the gallery. Then the males die. The impregnated female nematode seeks out a larval bark beetle in a nearby gallery and enters the insect's body to start a new infestation. Inside the insect's body, the nematode takes nourishment and expands into the large, swollen, egg-producing form.

About the time the beetle becomes adult, the female nematode inside the insect lays her eggs. After hatching, the young nematodes continue growing and eventually exit from the beetle's head. The beetle is killed after she has transported the nematodes to a new gallery system where the nearby healthy beetles are attacked.

# Kill 'Em



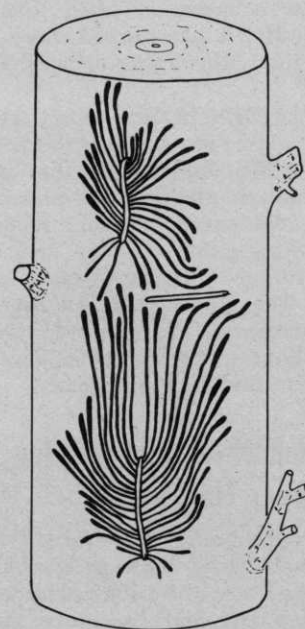
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Normal borer galleries run parallel to the branch with lateral lines formed by larvae. Parasitized borers mine horizontal galleries without lateral lines.