The Walnut Husk Fly

pest new in northern California found in Sonoma Valley and near Santa Rosa

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The walnut husk fly—*Rhagoletis completa* Cresson—was not known to exist in northern California until its discovery in a small walnut orchard near Sonoma in 1954. Because the find was made late in the fall, there was no opportunity to study the distribution of the pest in northern California that season.

The walnut husk fly has but one generation each year. The adult flies emerge from the soil from about the end of June into September. Following mating, the females lay their eggs in the walnut husks, usually in batches. Upon hatching, the yellowish maggots begin feeding upon the husk. The outer epidermis of the husk is not attacked and the contour remains unchanged. The portion of the husk that is fed upon turns black and shows up as such through the epidermis. The infested area gives the nuts a somewhat mottled appearance. When mature, the maggots crawl out of the infested nuts, and pupate in the soil. The winter and spring are spent in this stage. Not all the husk flies emerge the first season. Some of the pupae carry over until the second year, and a very few possibly to the third year.

Damage to the nuts is caused by the feeding of the maggots. They reduce the internal content of the husks to a soupy black mixture that seriously stains the shell of the nut. Also, the moist condition produced adversely affects soundness and the lightness of meat color.

Plans for 1955 included surveys by the State Department of Agriculture and County Agricultural Commissioners to determine the extent of the infested area and to evolve a suppression program. An investigation of the habits of the pest under northern California conditions was conducted by the University.

The husk fly was found throughout the Sonoma Valley, and a single specimen was taken not far from Santa Rosa. The infestation within the area was mostly light and at the outlying localities seldom were more than one or two specimens taken. The region of heaviest infestation was fairly well restricted to the locality where the pest was first found.

Few commercial plantings of walnuts occur in the infested zone, and the ones present are mostly small. The region is mainly a resort area, with numerous walnut trees about homes.

The suppression program consisted of spraying the soil beneath the trees with endrin at the rate of six pounds to the acre. This treatment was apparently very toxic to the flies when they emerged from the soil. Following treatment there was a marked decline in the number of flies caught in the traps. Applications of endrin were restricted in the main to trees within about a one half mile radius of the original infestation.

The principal studies on the habits of the fly were conducted in two orchards where trapping records indicated the presence of relatively large populations. Treatment was applied to one orchard on July 22, when 16 flies were captured in two traps. The second orchard was treated on July 28, when 13 flies were taken in two traps. The earliest any fly was trapped was July 12.

Numerous surveys were conducted to determine the seasonal trend of infestation in the developing walnut crop. No infested nuts were encountered until September 7, when six were found in one of the orchards after an extensive search. In subsequent surveys a few infested nuts were taken in both orchards. Infested nuts were difficult to find and at harvest on October 22, several thousand nuts were examined in each orchard without finding a single one that had been unmistakably infested by maggots of the husk fly.

On October 6, a general survey was conducted throughout the Sonoma Valley. Black as well as English walnuts were examined. In two localities black walnut trees were found to be heavily infested by the husk fly. One location was in a residential area and within the zone where the soil under the trees had been treated with endrin. Fallen nuts from a large tree growing in a front yard were collected and of the 50 examined, 38 were infested by maggots of the husk fly and two by a scavenger species. There were many nuts in the tree and at least 10% were apparently infested.

One reason for the heavy infestation is that the endrin treatment may have been applied after many flies had emerged from the soil. A second explanation is that in a residential section, home owners gather the fallen nuts and throw them on waste heaps or in vacant lots. Thereby many infested nuts are deposited in localities far removed from the trees. The maggots on reaching maturity pupate in places where the emerging flies will never come in contact with soil treatments applied in the vicinity of the trees.

Another area of heavy infestation was well outside of the zone where suppressive action had been taken. At one homestead, 103 nuts on the ground under two large black walnut trees were collected. Of these, 52 were infested by the walnut husk fly, and four by some scavenger fly. There were many nuts still hanging in the trees and a considerable number of them showed evidence of being attacked. Near the black walnut trees were a number of late variety English walnuts that should have been susceptible to attack. Yet after an extended search not one infested nut was found. Not far from this locality there were a few roadside English walnut trees with a black walnut tree between two of them. There were approximately 50 nuts on the black walnut and three were infested with the walnut husk fly. A close examination of the nuts on the English walnut trees failed to produce a single infested nut. The nuts of black walnuts seem to be preferred to those of English walnuts. Furthermore there is one case where an infestation failed to develop in English walnuts even though no soil treatment had been applied.

On October 13, another survey was conducted to determine how extensive the infestation of the walnut husk fly was in black walnuts in the known infested area. The infestation was light, and—although there were many nuts still hanging in the trees—it is possible that the optimum time for conducting this type of survey had passed. On October 22, one of the localities that was known to be heavily infested was visited again and only after a great deal of searching was a single infested nut found.

In southern California—where the husk fly has been a pest for many years—the severity of the infestation varies greatly from one year to the next. Therefore, the failure of the fly to be troublesome in Sonoma County, can not be taken to mean that it is not a potentially serious pest. It is probable that the status of the husk fly as a pest will not be known until there has been an opportunity to study it for several years.

The climate of northern California appears to be favorable to the husk fly and factors likely to influence damage are the varieties grown, whether the orchards are dry farmed or irrigated, and the culture programs followed.

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