BIOLOGICAL CONTROL RESEARCH ON THE WALNUT HUSK FLY

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This year's research was divided into 5 areas: (a) releases of New Mexico Psilus, (b) exploration in Arizona for more parasite material, (c) rearing of material for 1978 releases, (d) development of artificial diet for husk fly larvae, (e) continued survey of native parasites in California, (f) computerization and analysis of fly and parasite emergence data.

Release of New Mexico Diapriid.--A total of 38 mated females were released in two localities in California, 20 in Manteca, San Joaquin County and 18 in Mankas Corners, Solano County. Both sides were chosen for their high fly pupal densities to maximize the potential establishment of this pupal parasite. These represent the first pupal parasites of the husk fly released in California.

Two trips to Arizona were made during the summer.--During the first trip, sixty pupae, formed during the 1976 growing season, were sifted from the soil. Fourteen female diapriids emerged this year and were mated with males that were collected as adults. These were used to establish a laboratory colony (see below). On the 2nd trip almost 3000 puparia were sifted from the soil and some 2000 puparia were formed from larvae collected in nuts. These puparia were formed for the most part during the 1977 growing season and parasites are expected to emerge next summer after completing diapause. We expect both larval-pupal and pupal parasites from these collections.

Laboratory Rearings for Release.--Cultures of 3 diapriid populations, one each from New Mexico, Arizona and California, were expanded in order that more releases can be made during 1978 and 1979. The following numbers of husk fly puparia were exposed during 1977: 1675, 3420 and 6650, respectively. This material is being held under refrigeration for laboratory culture and field releases during 1978.

Artificial Diets for Husk Fly Larvae.--Eight diets were tested on both diapausing and non-diapausing strains of husk fly. The overall percent recovery is still below 50% with slightly better results coming from the non-diapausing strain. Over 400 pupae were produced and more tests have been designed to further improve the diets. A satisfactory artificial diet for husk fly would greatly increase the production of parasites since it would enable the year around culture of parasites using the non-diapausing strain of husk fly.

Survey for Parasites of the Husk Fly in California.--Puparia were collected from sites in and around Yuba City. The California diapriid species emerged from puparia from 2 of these sites. This greatly expands the known range of this parasite from Sonoma, Napa, Solano and San Joaquin Counties to now include Sutter County. This diapriid species is apparently invading new areas on its own.

Computerization and Analysis of Husk Fly and Parasite Emergence Data.--Data for over 6000 individual flies or parasites have or very shortly will be placed on computer tape. Initial analyses with the computer of the emergence data are almost complete and it is expected that from these analyses that we will improve our understanding of the biologies of both the husk fly and its parasites, as well as giving us better predictive equations for laboratory rearings.