

- MacGillivray, M. E. 1954. Note on *Myzus ascalonicus* Doncaster (Homoptera: Aphidae), an aphid new to North America. *Can. Ent.* 86: 454.
- Massee, A. M. 1935. Notes on the strawberry aphid (*Capitophorus fragariae* (Theo.)). *Ann. Rept. East Malling Res. Sta. for 1934*: 173-179.
- Mellor, F. C. and A. R. Forbes. 1960. Studies of virus diseases of strawberries in British Columbia III. Transmission of strawberry viruses by aphids. *Can. J. Botany* 38: 343-352.
- Palmer, M. A. 1952. Aphids of the Rocky Mountain Region. The Thomas Say Foundation. Vol. 5. 452 pp.
- Richards, W. R. 1958. Personal communication, dated July 4.
- Richards, W. R. 1959. A new genus and three new species of Aphididae (Homoptera). *Can. Ent.* 91: 248-253.
- Schaefers, G. A. 1960. A systematic study on the strawberry aphid complex (*Pentatrachopus* spp.). *Annals Ent. Soc. Amer.* 53: 783-793.
- Spencer, G. J. 1959. On mounting lice by the Ris Lambers method for aphids. *Proc. Ent. Soc. British Columbia.* 56: 53.

Resistance to insecticides in root maggots in British Columbia

Considerable experimentation by entomologists of the Victoria, Agassiz, Chilliwack, and Kamloops laboratories resulted in effective controls for onion maggots, *Hylemya antiqua* (Meig.), in onions; cabbage maggots, *Hylemya brassicae* (Bouche), in cole crops; and carrot maggots (carrot rust fly), *Psila rosae* (F.), in carrots, parsnips, and celery. Each control included one or more of the cyclodiene group of chlorinated hydrocarbons.

Until 1957, damage to onions was reduced below one per cent by using dieldrin applied to the seed. In 1957 damage at one location near Vancouver was above 75 per cent and great numbers of maggots were present. In 1958 damage was general wherever onions were grown commercially in B.C. Puparia sent to Oregon State University, Corvallis, for toxicological testing showed that maggots from Vancouver, Vernon, Kamloops and Kelowna were resistant to dieldrin and heptachlor but still susceptible to DDT and malathion.

In 1959 reports of poor control of cabbage maggots near Victoria on Vancouver Island indicated that resistance had developed. Puparia from the fields concerned and from fields near Vancouver were sent to the Entomological Laboratory, Chatham, Ont., for testing. The results showed that flies from the fields on Vancouver Island had a high

degree of resistance to cyclodiene hydrocarbons but were still susceptible to the phosphate Diazinon. Flies from the lower mainland were still susceptible to both types.

In 1961 loss of the first planting of carrots at Colony Farm, Essondale, signalled resistance in carrot maggots. Puparia from this field were sent to Chatham for testing. The results showed a high degree of resistance to the cyclodiene insecticides but susceptibility to phosphates.

Resistant cabbage and carrot maggots occurred only in isolated pockets until the summer of 1962. Then resistant cabbage maggots were reported and later confirmed from Abbotsford and Cloverdale, the two principal cole crop areas of the lower mainland. Uncontrolled damage in 1962 to first planting carrots at Colebrook and to second planting carrots at Cloverdale with later confirmatory tests showed that resistant carrot maggots had become established in those areas.

An alarming feature was the very large numbers of each species at locations where resistance developed. We are now faced with the problem of reducing the population to acceptably low numbers using control practices that are not entirely satisfactory.

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