

EARLY BIOLOGICAL CONTROL ATTEMPTS IN CANADA

B. P. BEIRNE¹ AND J. S. KELLEHER²

ABSTRACT

Seven attempts at biological control by introduction were made against six species of insects in Canada in 1882 to 1907. None apparently was successful.

Biological control attempts in Canada since 1910 were reviewed by McLeod, McGugan, and Coppel (1962) and in C.I.B.C. Technical Communication No. 4 (1971) and were evaluated by Turnbull and Chant (1961) and Munroe (1971). Earlier attempts were, however, omitted. They are reviewed here because most of the target species were not subjects of attempts after 1910.

Nematus ribesii (Scop.), the imported currantworm, was the subject of the first recorded biological control attempt by introduction in Canada. In 1882 Saunders imported into Ontario from New York eggs of *N. ribesii* that contained what is now known as *Trichogramma minutum* Ril. (Hym.: Chal.) and placed them near newly-laid eggs in the field, presumably near London, Ontario (Saunders, 1882). The consequences were not recorded, but it is highly unlikely that *T. minutum* was not already widespread in Ontario.

Another attempt against *N. ribesii* was made in 1892. Eggs parasitized by a *Trichogramma* sp. from Arnprior, Ontario, were distributed by Fletcher in gardens in the vicinity of Ottawa where, however, he soon found that the parasite "was already present in strong force" (Fletcher, 1893). Thus the attempt was redundant.

Phytophaga destructor (Say), the Hessian fly, was the subject of the first apparent attempt with an agent imported from overseas. In 1891 Hessian fly pupae containing *Pediobius epigonus* (Walk.) (Hym.: Chal.) were imported into the United States by Riley who sent some to Forbes in New York State, and Forbes in turn sent some to Fletcher at Ottawa (Forbes, 1891; Riley, 1892). It is not clear from the literature (Riley, 1893; Howard, 1895) whether or not Fletcher actually liberated those parasites. If he did, there is no indication that the species became established in Canada as a result. A record of this parasite from Prince Edward Island in

1898 (Fletcher, 1900) is questionable (Peck, 1963), and anyway if correct could not reasonably have originated from a liberation in Ontario two years previously. This biological control attempt thus can be safely classed as a failure.

In 1896 Fletcher (1897) imported from California apricot scales, *Lecanium armeniacum* Craw., containing *Encyrtus fuscus* How. (Hym.: Chal.). Some of the parasites were liberated in Ottawa in an elm tree that had an infestation of a *Lecanium* sp. This biological control attempt was redundant as the parasite was known to occur already in the Ottawa district: in Hull, Quebec, in 1887, as *Chiloneurus maculatipennis* Prov. (according to Peck, 1963).

The remainder of the *Encyrtus fuscus* material was sent to Grimsby, Ontario, to be liberated against what is now known as *Lecanium tiliae* L., the European fruit lecanium (Fletcher, 1897). It is not clear whether or not it was actually liberated. If it was, the liberation probably was redundant because of the likelihood that the parasite was already in Ontario (see above). Records for it from a species of *Lecanium* in Ontario in 1901 (Fletcher, 1902) and from *L. tiliae* (as *L. corni* Bouche) in Ontario in 1910 (Jarvis, 1911) are most unlikely to have arisen from the possible liberation of 1896.

In or before 1907 Fletcher (1907) introduced specimens of *Lepidosaphes ulmi* (L.), the oystershell scale, that contained a fungus from Nova Scotia into a locality in western Ontario where *L. ulmi* and *Quadraspidiotus perniciosus* (Comstock), the San Jose scale, were common, but neither became infected there.

None of the seven attempts against the six species could be evaluated as even possibly successful and most of them probably were redundant in that the introduced agents probably were already inhabitants of the regions where they were liberated. Two of the six target species, *L. tiliae* and *L. ulmi*, were subjects of subsequent attempts, after 1910, but with different agents from those mentioned above.

¹Pestology Centre, Department of Biological Sciences, Simon Fraser University, Burnaby 2, B.C.

²Scientific Information Section, Canada Department of Agriculture, Ottawa, Ont.

References

- C.I.B.C. 1971. Biological control programmes against insects and weeds in Canada 1959-1968. 1971. Tech. Comm. Commonw. Inst. Biol. Control 4.
- Fletcher, J. 1893. On an egg-parasite of the currant saw-fly. Ann. Rep. Can. Dept. Agric. Expt. Farms 1892: 158-9.
- Fletcher, J. 1897. Report of the Entomologist and Botanist. Ann. Rep. Can. Dept. Agric. Expt. Farms 1896: 225.
- Fletcher, J. 1900. **The Hessian Fly**. Ann. Rep. Can. Dept. Agric. Expt. Farms 1899: 168-170.
- Fletcher, J. 1902. The Blackberry Soft-Scale (*Lecanium fitchii*, Sign.) Ann. Rep. Can. Dept. Agric. Expt. Farms 1901: 241.
- Fletcher, 1907. In March 6, 1907, Rep. Select Standing Committee on Agriculture and Colonization, Canada Parliament: page 127.
- Forbes, S. A. 1891. The importation of a Hessian fly parasite from Europe. Insect Life 4: 179-181.
- Howard, L. O. 1895. Insect Life 7: 356.
- Jarvis, T. D. 1911. The Coccidae of Canada. Ann. Rep. Ent. Soc. Ont. 1910: 75.
- McLeod, J. H., B. M. McGugan, and H. C. Coppel. 1962. A review of biological control attempts against insects and weeds in Canada. Commonw. Inst. Biol. Cont. Tech. Comm. 4: 216 pp.
- Munroe, E. G. 1971. Status and potential of biological control in Canada, pp 213-255. In Biological control programmes against insects and weeds in Canada 1959-1968. Tech. Comm. Commonw. Inst. Biol. Control 4.
- Peck, O. 1963. A Catalogue of the Nearctic Chalcidoidea (Insecta: Hymenoptera). Canad. Ent. Suppl. 30, 1092 pp.
- Riley, C. V. 1892. Report of the Entomologist for 1891. In Rep. Secretary of Agriculture for 1891, U.S. Dept. Agric. 235-6.
- Riley, C. V. 1893. Parasitic and predaceous insects in applied entomology. Insect Life 6: 130-133.
- Saunders, W. 1882. Address of the President. Canad. Ent. 14: 142-150.
- Turnbull, A. L. and D. A. Chant. 1961. The practice and theory of biological control of insects in Canada. Canad. J. Zool. 39: 697-793.

Lester A. Swann &
Chas A. Papp
1972

**THE COMMON INSECTS OF
NORTH AMERICA**

Harper & Row, Publishers
Inc. Pp xiii & 750

This is a very courageous undertaking, and on the whole a successful one. The purpose is nothing less than to provide "an easy way to identify the more common insects of North America north of Mexico". It is the next logical step beyond Essig's *Insects of Western North America*, and is perhaps more usable by laymen. The concept is that of a simple, swift introduction to insects as animals, their characteristics, biology and value; a short pictured key to Orders; then the descriptions of Ametabola (6 spp.), Paurometabola (169 spp.), and Holometabola (996 spp.); a list of families represented; a 14-page glossary; a general bibliography, up-to-date and well chosen; and a technical taxonomic bibliography, by and for specialists. Canadians and C.D.A. workers are very well represented, especially in the latter. There are two indexes: subjects and common names (14 pp.); and scientific names (24 pp.).

The line drawings are always across the top of the page, a useful idea for quick reference. An adult of every one of the 1171 spp. is illustrated. Often there is more than one drawing per species, showing an egg, a larva or a pupa, venation, habitus, etc. On average each insect is shown from one to two inches long, with a size scale given, unfortunately, I think, in inches taken to two places of decimals for minute forms. Few available rulers show inches in tenths, much less in hundredths. Surely millimeters would have been a more useful scale, and certainly one with a better future? However, it should not be a great task to convert the figures for some future edition. The description is generally opposite or below the drawing on the same page. Ranges are given with utmost economy in the text.

A bonus is a centre section of 8 pages in color, showing such lepidopterous goodies as swallowtails, a cecropia, a monarch and a viceroy, admirals, fritillaries, polyphemus, imperial and cynthia moths, and a small, colorful selection of bees, wasps, beetles and three flies.

The authors are Californians, and the foreword is by Dr. Evert I. Schlinger, of the University of California at Berkeley.

H. R. MacCarthy