

The high mortality caused by concentrations of IS of 0.5% and higher (Table 1) show that this compound is an effective pesticide for all whitefly stages other than eggs. If used at 0.5% concentration, IS would effectively control whitefly populations with little effect on adult *E. formosa*. In view of the many beneficial features of the environmentally compatible Insecticidal Soap solution this compound should be assessed in any integrated program

that includes the parasitoid, *Encarsia formosa*.

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THE LETTUCE APHID, *NASONOVIA RIBISNIGRI* (HOMOPTERA: APHIDIDAE) DAMAGING LETTUCE CROPS IN BRITISH COLUMBIA

A. R. FORBES AND J. R. MACKENZIE

Research Station, Agriculture Canada
6660 N.W. Marine Drive, Vancouver, B.C. V6T 1X2

ABSTRACT

The lettuce aphid, *Nasonovia ribisnigri* (Mosley), is recorded for the first time as a serious pest of lettuce in the Cloverdale area of British Columbia.

In the summer of 1981 several lettuce growers in the Cloverdale area of British Columbia suffered severe and unexpected crop losses caused by the lettuce aphid, *Nasonovia ribisnigri* (Mosley). Although this aphid had been present on other plants in the lower mainland of B.C. for many years (Forbes, Frazer and MacCarthy, 1973), it had not been recorded previously as a pest of lettuce. The aphid was found in marketed heads in September 1981 and resulted in an estimated retail loss of \$80,000. Crops which were headed up and infested with aphids had to be ploughed in because the heads were considered unmarketable. In 1982 lettuce aphids were found in commercial lettuce plantings in late May and by the end of June they were causing rejection of some shipments for marketing. The infestation became progressively worse and during August several plantings had to be ploughed in. Both crisp heading and butter-head lettuce crops were seriously affected.

N. ribisnigri (Fig. 1) is a medium-sized (2-3 mm long) olive-green aphid with a distinctive dorsal sclerotic pattern. Its antennae are long with secondary sensoria on the basal 1/4 - 3/4 of segment III in apterae (Fig. 2A) and all along segment III in alatae (Fig. 2B). Its cornicles are cylindrical, with a

distinct preapical annular circumcission (Fig. 2C). Its cauda is finger shaped usually with 7 hairs (Fig. 2D). Both Hille Ris Lambers (1949) and Heie (1979) give detailed morphological descriptions of the various morphs of the aphid. We have also collected and reared a pink form of *N. ribisnigri* in B.C.

This is an heteroecious aphid with *Ribes* spp. as primary hosts and secondary hosts in the Compositae and several other plant families. In B.C. we collected adult fundatrices and fundatrigeniae (mostly alate) on black currant, *Ribes nigrum* L., in mid-May. Migration to lettuce and other secondary hosts takes place in late May and in June. Migration back to *Ribes* probably takes place in September and October. In England during mild winters some of the aphids are able to continue to breed on lettuce outdoors throughout the winter. This can probably occur in the Fraser Valley too and would result in sizeable populations of lettuce aphids being present on overwintered lettuce and other secondary hosts ready to infest newly planted crops in the spring.

In Canada, this aphid has been previously recorded in B.C., Quebec and New Brunswick (Smith and Parron, 1978). In the eastern United States it has been collected in New York, Vermont, Pennsylvania, New Jersey, District of Columbia

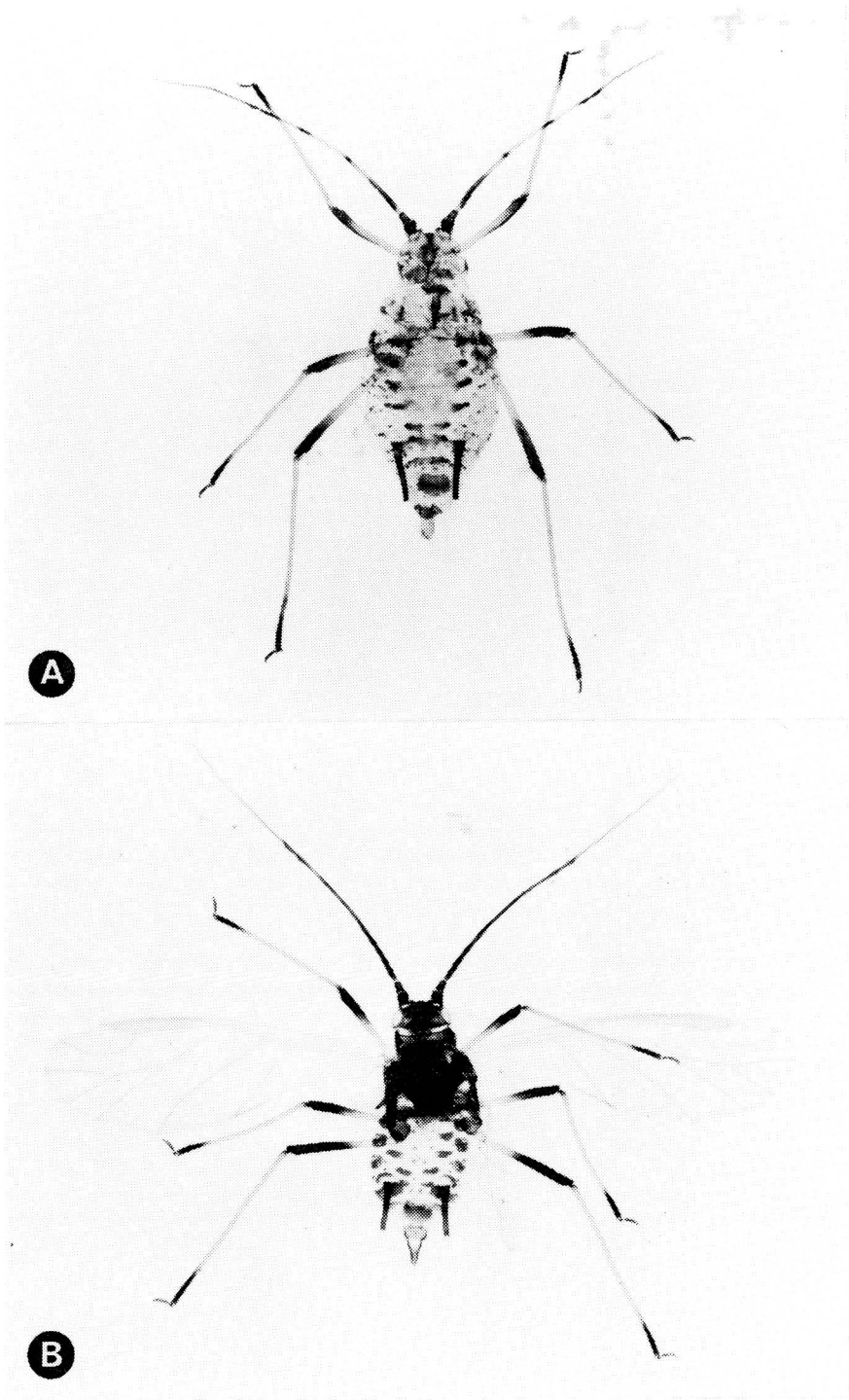


Fig. 1. Photomicrographs of *Nasonovia ribisnigri* (Mosley). A. Adult apterous aphid. B. Alate aphid.

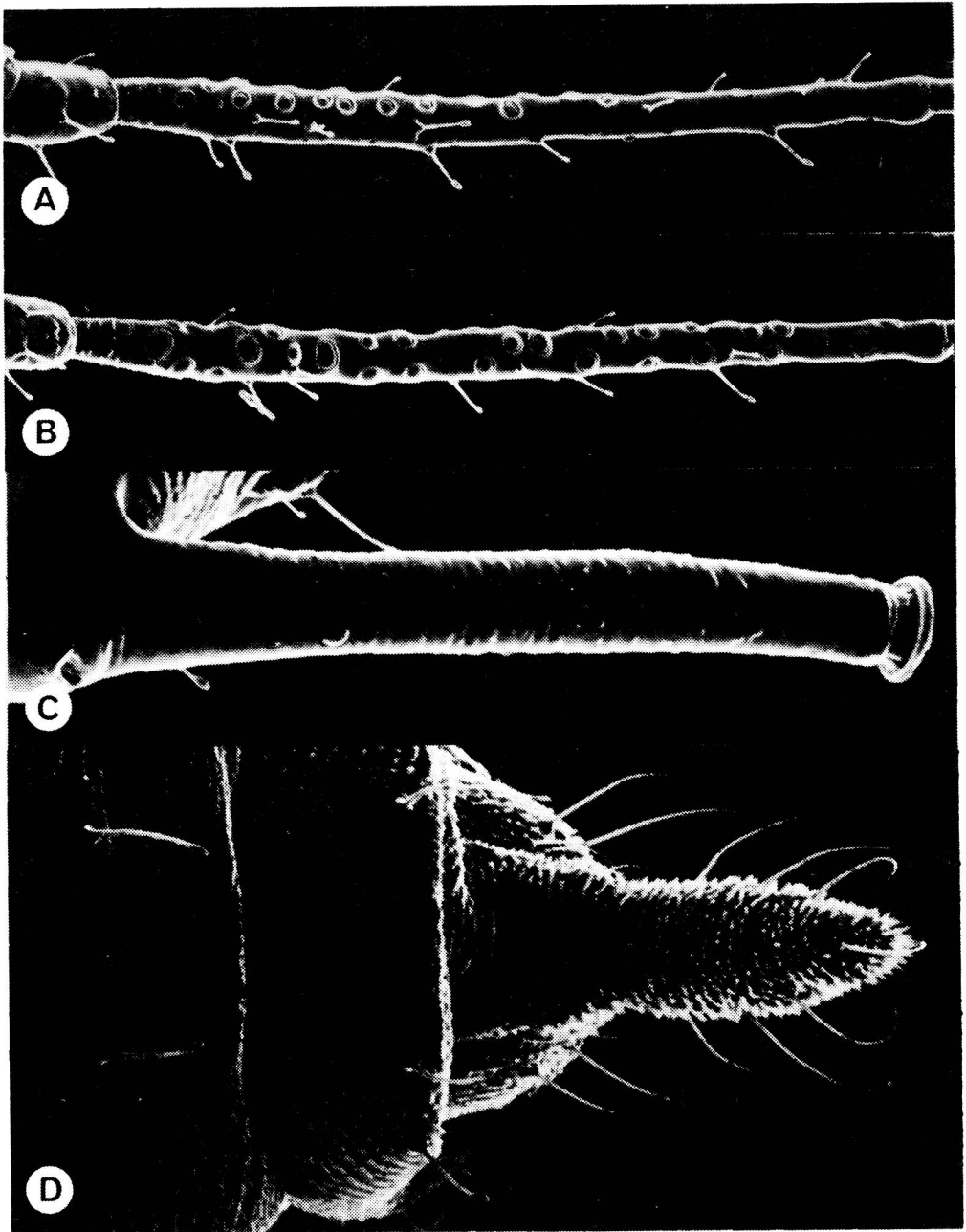


Fig. 2. Scanning electron micrographs of *Nasonovia ribisnigri* (Mosley). A. Third antennal segment of aptera. B. Third antennal segment of alata. C. Cornicle. D. Tip of abdomen and cauda.

and possibly North Carolina (Smith and Parron, 1978); in the western United States in Montana (Smith and Parron, 1978) and Oregon (Leonard, 1974). It has not, however, been previously documented as a pest in North America. In Britain it is recognized as probably the most important

aphid pest of lettuce both out of doors and under glass (Ministry of Agriculture, Fisheries and Food, 1978).

Even small numbers of *N. ribisnigri* are of serious concern since this aphid tends to colonize inside the forming heads rendering them unaccep-

table for market. Once in the heads the aphids are virtually impossible to contact with foliar sprays. Large populations would, of course, cause direct damage by their feeding and deposits of honey dew. This aphid is also a potential threat as a vector of lettuce-infecting viruses, especially cucumber mosaic and perhaps beet western yellows. *N. ribisnigri* is reported to be unable to transmit lettuce mosaic (Kennedy, Day and Eastop, 1962).

Other species of aphids, especially the green peach aphid, *Myzus persicae* (Sulzer), and the potato aphid, *Macrosiphum euphorbiae* (Thomas),

occur commonly on lettuce in B.C. but they usually breed on the underside of the outer leaves, where they do not contaminate the saleable crop.

The lettuce aphid is now the most important insect pest of lettuce in British Columbia. The present outbreak demonstrates the ineffectiveness of currently recommended control strategies. Consequently, extensive monitoring of aphid populations and field tests to evaluate the efficacy of several aphicides including some promising systemics are in progress. Special attention is being given to optimum timing and placement of sprays.

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LEAFROLLERS (LEPIDOPTERA) ON BERRY CROPS IN THE LOWER FRASER VALLEY, BRITISH COLUMBIA

DAVID R. GILLESPIE¹ AND BRYAN P. BEIRNE

Pestology Centre, Dept. of Biological Sciences, Simon Fraser University
Burnaby, B.C. V5A 1S6

A survey of tortricid leafrollers and other lepidopterous larvae with leafrolling habits on berry crops in the Lower Fraser Valley, B.C. revealed 16 species feeding on blueberry, four on cranberry, eight on raspberry and four on strawberry. The most abundant species were *Choristoneura rosaceana*, *Spilonota ocellana*, *Archips rosanus* and *Cheimophila salicella* on blueberry, *Operophtera bruceata*, *C. rosaceana* and *Acleris comariana* on raspberry, *Rhopobota naevana* on cranberry, and *A. comariana* on strawberry. Some of the species have apparently not been reported previously as feeding on some of the berry crops. Four species previously reported as pests of berry crops in the Lower Fraser Valley were not found.

Fields treated with insecticides early in the season, whether or not for leafrollers, had lower leafroller populations than untreated fields. There is no objective evidence that leafroller populations were sufficient to cause economic injury to any of the crops. Subjective observations confirm the economic importance of leafroller damage to cranberry and suggest that economic injury may occur on blueberry.

INTRODUCTION

The objectives of this work were to determine the leafroller fauna of berry crops in the Lower

Fraser Valley of British Columbia, and the abundance of the species involved relative to each other and to the crops they affect.

Species of leafrollers (Lepidoptera; Tortricidae) and other lepidopterous larvae with similar habits are considered to be pests of berry crops in the Fraser Valley. There are general control recommen-

¹Present address: Research and Plant Quarantine Station, Agriculture Canada, 8801 East Saanich Road, Sidney, B.C. V8L 1H3.