Short communication

On the identity of *Anagrus* (Hymenoptera: Mymaridae) egg parasitoids of Froggatt's apple leafhopper, *Edwardsiana crataegi* (Douglas) (Homoptera: Cicadellidae), in Christchurch, New Zealand

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Since their discovery in New Zealand by Dumbleton (1934, 1937) there has been considerable interest in the egg parasitoids of Froggatt's apple leafhopper, *Edwardsiana crataegi* (Douglas), previously known as *Typhlocyba froggatti* Baker and by several other names (Knight 1976, Charles 1989). *E. crataegi* is the only known leafhopper to inhabit apple in New Zealand (Knight 1976).

The parasitoid specimens that L.J. Dumbleton reared from *E. crataegi* eggs in Nelson were incorrectly identified as *Anagrus armatus* (Ashmead) var. *nigriventris* Girault. This name was incorrectly applied to the egg parasitoids of *E. crataegi* in New Zealand and Tasmania, Australia, until it was shown that *A. armatus* and *A. nigriventris* are two separate New World species (Chiappini *et al.* 1996) and that neither of them has been recorded from New Zealand (Triapitsyn 2001). Moreover, *Edwardsiana* species are not among the established hosts of *A. nigriventris* (Triapitsyn & Moratorio 1998).

Recently, Dumbleton's voucher specimens from Nelson were located and identified as *Anagrus avalae* Soyka, also a common European species (Triapitsyn 2001). *Anagrus avalae* was redescribed and illustrated by Chiappini and Triapitsyn (1997) who also listed several of its leafhopper hosts on various Rosaceae plants in Europe and North America, including *Ribautiana tenerrima* (Herrich-Schaffer).

Teulon and Penman (1986a) collected egg parasitoids using sticky boards in an abandoned apple orchard in Christchurch, New Zealand, in association with a population of Froggatt's apple leafhopper. Summer egg parasitism of *E. craetagi* was also reported, and a selection of adult mymarid parasitoids from these sources was identified as *A. armatus* by the late E.W. Valentine (D.S.I.R., Auckland). The specimens from these identifications were kept by E. W. Valentine but they could not be located in the New Zealand Arthropod Collection, Auckland, and are presumed lost. Teulon and Penman (1986b) also noted large numbers of the blackberry inhabiting leafhopper *R. tenerrima* and *Anagrus* on the edge of this orchard.

The few specimens of Froggatt's apple leafhopper egg parasitoids identified from recent collections in Havelock North, Hawke's Bay (March and May 1990), and Lincoln, Canterbury (November 1995), New Zealand, were *A. ustulatus* Haliday (both locations) and *A. atomus* (L.) (only at Havelock North, March 1990) (Triapitsyn 2001). Both of these parasitoids are common European species that were apparently unintentionally introduced into New Zealand (Triapitsyn 2001, Trjapitzin 1995).

After the recent discovery of the true identity of Dumbleton's *Anagrus*, we decided to recollect egg parasitoids of Froggatt's apple leafhopper in the same location where Teulon and Penman (1986a) sampled during 1980-1982. Unfortunately, the original abandoned orchard in Highsted Road, Christchurch, has been destroyed. Nevertheless, in late March 2001 leaves with signs of leafhopper damage were collected from two different apple trees of an unknown variety, standing within 50 m of where the abandoned orchard had been located. The leaves were placed in plastic containers with moist paper. After about seven days emerged adult parasitoids were collected, preserved in 70% ethanol and sent to the senior author for identification.

Two species of *Anagrus* were found in these samples: *A. ustulatus* (the majority of specimens) and *A. avalae*. Both species were found on a single tree. The results of our brief experiment are significant because we have shown for the first time that these two different species, both of an apparent European

origin, co-exist on a single apple tree and utilize the same leafhopper egg resource possibly in competition with each other.

These observations raise several interesting questions relating the distribution, relative abundance and phenology of the three Froggatt apple leafhopper egg parasitoids (*Anagrus ustulatus, A. avalae* and *A. atomus*) on apple in New Zealand, and the importance of other leafhoppers such as *R. tenerrima* as alternative hosts for these parasitoids.

Material examined

***A. avalae*:** New Zealand, Christchurch, 27 iii 2001, C. D. Fletcher and D. A. J. Teulon, 2 females (emerged 3.iv.2001 from leafhopper eggs in leaves of "red" fruited apple).

***A. ustulatus*:** same data as above, 7 females and 1 male. Specimens deposited in the collection of the Entomology Research Museum, University of California, Riverside [UCRC].

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