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The Life History of *Rhopalosiphum insertum* (Apple-grass Aphid) in Bramley's Seedling Apple Orchards

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INTRODUCTION

Within the British Isles eight species of aphid have been found feeding on apple. Five of these are pests capable of causing economic losses (Anonymous, 1985). These are the woolly aphid (*Eriosoma lanigerum* (Hausmann)), rosy apple aphid (*Dysaphis plantaginea* (Passerini)), the rosy leaf-curling aphid (*Dysaphis devector* (Walker)), the green apple aphid (*Aphis pomi* (Degeer)) and the apple-grass aphid (*Rhopalosiphum insertum* (Walker)) (Anonymous, 1985). It is the latter species that occurs in large numbers in the Bramley's Seedling apple orchards in Northern Ireland (Mowat and Clawson, 1996; Cuthbertson and Murchie, 2006a). Apple aphids are most numerous in the orchards during April and May and the worst damage is caused in this period. With the exception of *A. pomi*, which sometimes re-appears in large numbers after mid-summer, the other four species are either absent from apple, or present in very small numbers, from the end of June until the autumn. *Rhopalosiphum insertum* is usually found on the rosette leaves of the blossom trusses. Unless very abundant, *R. insertum* causes little harm to foliage, apart from slight leaf-curl (Anonymous, 1985). Eggs of this aphid are laid on the roughened areas of the spurs and small branches. In the southeast of England, the migration to grasses begins in May and few aphids remain after petal fall (late May to early June). The return migration to apple occurs again in the autumn (Alford, 1984).

Rhopalosiphum insertum ranges in size from 1.0-1.6 mm in length (Anonymous, 1985). The adult is plump, yellowish/green with darker green longitudinal strips down the body (Alford, 1984). The siphunculi are short, pale green and flanged apically. *Rhopalosiphum insertum* overwinters on the Bramley trees in the egg stage (Fig. 1). Usually these hatch by the green-cluster stage of development. The nymphs then feed on the underside of the young rosette leaves or amongst the flower buds. At the pink bud stage, they may invade the petals. During the blossom period the first winged aphids migrate to grasses. By the start of June they have virtually all migrated. In the autumn, winged females return to the apple trees and their wingless progeny (the egg laying females) mate with winged males returning from the grasses. Over-wintering eggs are deposited on spurs and branches.

There is little or no damage from this species after mid-blossom (Alford, 1984). Earlier in the spring the aphids may cause slight leaf curl, but they have no effect on fruit development (Solomon, 1987). Solomon (1987) also regarded this species as being of low economic importance. However, in 1995 it caused yield reductions to the apple crop in Northern Ireland (Department of Agriculture and Rural Development for Northern Ireland, unpublished data) and, as a result, has been classed as being of economic importance within Northern Irish apple orchards (Mowat and Clawson, 1996). Also in 1996, 1298 spray hectares received treatment for aphids (Kidd *et al.*, 1996). One of the most frequently-used aphicides by Northern Irish apple growers was fenitrothion, with 466 spray hectares receiving application. Perhaps, fruit growers were applying aphicide sprays simply because the pest was present in large numbers. Applying chemical sprays for the control of

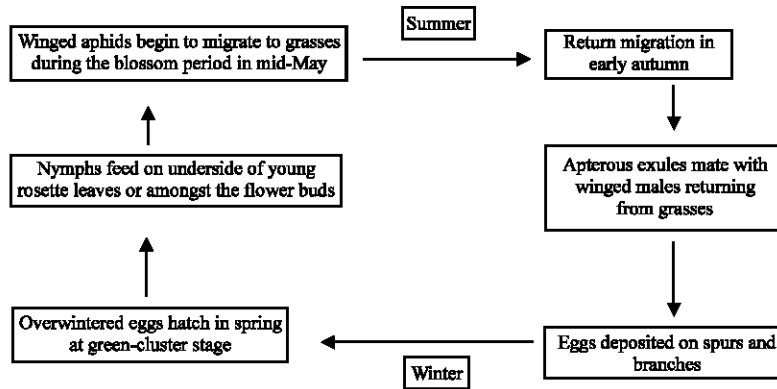


Fig. 1: Lifecycle of the apple-grass aphid, *Rhopalosiphum insertum* on apple

R. insertum has also been shown to cause increases in other pest species such as apple-rust mite, *Aculus schlechtendali* (Cuthbertson and Murchie, 2006a). The effect of the chemicals removing natural enemies and so allowing pest numbers to increase unchecked is seen as the most likely answer to this phenomenon (Cuthbertson and Murchie, 2006b).

Bramley's Seedling apple orchards that receive acaricide treatments tend to have greater pest populations than those that receive no acaricides (Cuthbertson and Murchie, 2006a-c). Within Northern Irish apple orchards numbers of *R. insertum* regularly exceed the UK Agricultural Development and Advisory Service spray threshold (Cross and Berrie, 1994; Cuthbertson and Murchie, 2005a, 2006a) and therefore damage would be expected. The reasons for little damage occurring may be related to higher natural enemy numbers on untreated trees. *Anystis baccarum*, a commonly occurring predatory mite within the Bramley orchards (Cuthbertson and Murchie, 2005b) is known to be a valuable aphid predator (Cuthbertson *et al.*, 2003; Cuthbertson and Murchie, 2004). Over-wintering and early spring predation, of both eggs and juveniles, by *A. baccarum* along with other predatory species may act to slow the population growth of *R. insertum*, compared to insecticide treated trees, where the natural enemy population could have been depleted due to winter-washes or early season pesticide applications (Cuthbertson and Murchie, 2006b, c). The over-wintering eggs of *R. insertum* may also prove to be a valuable food source helping to sustain winter populations of *A. baccarum*, much in the same way as *A. schlechtendali* (Cuthbertson and Murchie, 2006d, e). However, as the spring populations of aphids are not present on the trees for long and soon migrate to grasses on the advancement of rising summer temperatures, Mowat and Clawson (1996) concluded that a pesticide of short persistence would suffice for *R. insertum* control in Northern Irish orchards.

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