**FLORAL RESOURCES FOR NATURAL ENEMIES: THE EFFECT
OF *PHACELIA TANACETIFOLIA* (HYDROPHYLLACEAE) ON
WITHIN-FIELD DISTRIBUTION OF HOVERFLIES
(DIPTERA:SYRPHIDAE)**

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Adults of many arthropods regularly visit flowers to feed on nectar and pollen. This 'maturation feeding' is required before the eggs can mature (Schneider 1948; Jervis and Kidd 1986). The quality of this food influences longevity, fecundity and therefore the efficiency of any natural enemy. Beneficial arthropods can be attracted to a desired site of action through provision of suitable food resources (Powell 1986). A problem is that several of the preferred plant species are also serious weed species.

In the search for non-weed floral resources, novel crops have been tested for attractiveness to natural enemies (Lövei *et al* in press). Flowers of the American ornamental *Phacelia tanacetifolia*, have been shown to be very attractive, especially to hoverflies (Syrphidae) (Lövei *et al* in press). The larvae of several hoverfly species are aphidophagous and have been shown to be able to prevent their prey populations from increasing (Chambers and Adams 1986; Tenhumberg and Poehling 1990). In New Zealand, two native species of hoverflies with aphidophagous larvae, *Melanostoma fasciatum* and *M. novaezealandiae* are commonly found in the agricultural environment (G.L.Lövei, unpublished data). To date data have been equivocal concerning the extent of oviposition of hoverflies in crops neighbouring flower strips (Chandler 1968; Dixon 1959). As an initial evaluation of the value of *P. tanacetifolia* flowers to attract hoverflies into the crop habitat, we studied the within-field distribution of hoverflies during flowering (late December - mid February).

P. tanacetifolia was planted as a 1.5 m x 55 m central strip, in two wheat paddocks on the organic farm at MAF Technology Flock House Agricultural Centre. Hoverflies were monitored with yellow pan traps, placed at 1 m height, between mid-December and mid-February. Two parallel rows of traps were set within the *P. tanacetifolia* strip as well as in rows 1, 3, 5, 10 m away, at the edge of the paddock (30 m from the central strip on paddock A, 50 m on paddock B) and along the edges of the adjacent paddocks (about 100 m), in both directions. The traps contained water and detergent and were checked weekly. The trap catch was first sorted under a microscope and stored in 70% alcohol for identification and dissection.

All but three of the syrphids caught were *Melanostoma fasciatum* although trap catches were considerably lower than the numbers suggested by direct observation (Lövei *et al* in press). In general, *P. tanacetifolia* attracted the adult syrphids to the experimental field. The number caught within the field was three to eight times greater than that at the paddock edge or in the neighbouring paddock (Figure 1). Catches in the central strip itself were low as the syrphids probably preferred the flowers to the yellow trap colour. The largest trap increase was found 3 m on each side of the central strip but an increase was still detectable 10 m from the middle (Figure 1). A similar effect has been found by Hickman and Wratten (unpublished) in England. These authors, by using *P. tanacetifolia* pollen as a marker, were able to demonstrate that hoverflies dispersed into the field up to 100 m from the marginal *P. tanacetifolia* strip.

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Figure 1: Total number of hoverflies caught in yellow pan traps at increasing distances from central *P.tanacetifolia* strip in wheat. Flock House, summer 1991-1992.

It is additionally worth noting that traps on the windward side of the *P. tanacetifolia* strip caught more flies than those on the leeward side. A consistent difference of this sort would indicate that the attractant plants should be planted on the downwind side of the target paddock, as hoverflies disperse more readily in an upwind direction.

It may be concluded that *P. tanacetifolia* attracted hoverflies into the paddock and thereby increased their densities to above the average for the neighbouring paddocks. As hoverflies lay their eggs in the neighbourhood of nectar resources, this method is promising as a method for manipulating syrphid natural enemies.

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