Foster those weeds for a little help from your friends

Derrick Rooney[1]

Parsley, sage, rosemary and thyme
Remember me to one who lives there
She once was a true love of mine…

These are not just lyrics from a great Paul Simon song. The first line is also a catalogue of four of the key plants for attracting helpful insects that will either pollinate flowers or help to reduce damage by aphids, caterpillars, and other pests: parsley for the predatory lacewings and hover flies; sage and rosemary for bumble bees; thyme for honey bees.

Another way of putting this is that strong populations of these and other helpful insects, and a good range of insect-friendly plants but not too much of any one thing, will help to reduce the need for sprays in a garden, park, woodlot, orchard, or field crops. A healthy population of beneficial insects also helps to ensure pollination of many plants. While bees are the main pollinators, they are not the only ones.

A phrase 'integrated pest management' has become quite fashionable in recent years and this is exactly what gardeners, foresters, and farmers alike should try to achieve. The principles of good management are essentially the same, whether the end product is going to be flowers, wood, grain, other seeds, fruit, vegetables, meat, or milk. They include both maintaining a good pest-predator balance to promote healthy plant growth, and carefully timing essential sprays so that the chemicals take out the maximum number of pest insects and the minimum number of beneficial ones[2]. You will not be able to eradicate pests like aphids and caterpillars, but it should be possible to hold them at acceptable levels by encouraging their natural enemies.

Irrigation is a useful tool for doing this because it enables helpful host plants such as cow parsley (*Anthriscus sylvestris*) to grow in drier or lighter soils where they would normally struggle to survive. A good trick is to grow a few plants that will attract both pollinating and predatory insects. The latter include lacewings (Fig. 1), hover flies (Fig. 2), ladybirds (Fig. 3), many solitary wasps (Fig. 4), carabid beetles (Fig. 5), even spiders (Fig. 6).

Fig. 1 Tasmanian lacewing (*Micromus tasmaniae*). Photo: © Steve Kerr, via NatureWatch NZ (http://naturewatch.org.nz/observations/4744113).

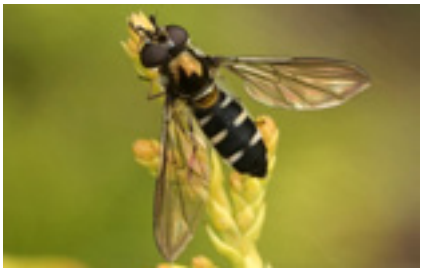

Fig. 2 Large hover fly (*Melangyna novaezelandiae*). Photo: © Catherine Beard, via NatureWatch NZ (http://naturewatch.org.nz/observations/5147179).

Fig. 3 Eleven-spotted ladybird (*Coccinella undecimpunctata*). Photo: © Steve Kerr, via NatureWatch NZ (http://naturewatch.org.nz/observations/2512001).

Fig. 4 European tube wasp (*Ancistrocerus gazella*). Photo: © Steve Kerr, via NatureWatch NZ (http://naturewatch.org.nz/observations/965860).

Fig. 5 South Island tiger beetle (*Neocicindela latecincta*). Photo: © Steve Kerr, via NatureWatch NZ (http://naturewatch.org.nz/observations/2557172).

Fig. 6 Cyclops jumping spider (*Opisthoncus polyphemus*). Photo: © Catherine Beard, via NatureWatch NZ (http://naturewatch.org.nz/observations/3218134).

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[2] Most beneficial insects are diurnal, so when you need to spray aphids and caterpillars, for example, you should do so in the evening or very early in the morning. The ideal is to achieve a balance between pest and prey insects, but we do not live in an ideal world and sometimes it comes down to a choice between killing pests or allowing them to render your crops worthless. There's also an economic factor. Agricultural and horticultural chemicals are not only often toxic (especially insecticides) but expensive as well, so it makes economic as well as environmental sense to minimise their use. You may have to stick to a spray schedule for fungal diseases spread by airborne spores because, however good your cultural practices, airborne infections will continue to arrive from outside. But anything that reduces the need for spraying is good.

Bumble bees

The current bumble bee population is dominated by the short-tongued species, whereas for pollinating many crops, and particularly for red clover, you want to encourage one of the long-tongued species. Three species of long-tongued bumble bee and one short-tongued species are naturalised in New Zealand. So how do you tell the difference? One way is to look at the stripes. The long-tongued bumble bees all have stripes at the front and back of the thorax (Fig. 7). The buff-tailed bumble bee (also known as the large earth bumble bee), *Bombus terresteris*, has the shortest tongue and only one stripe on the thorax and none at the very front of the abdomen (Fig. 8).

Native bees

There are 28 species of small, solitary, mostly ground-nesting native bees in New Zealand. Most of them live in small burrows or old bumble bee or mouse nesting sites, and most of them are specific pollinators of particular families of plants. One group of species includes important pollinators of many indigenous plants belonging to the myrtle family, including rātā, pōhutukawa, kānuka, and (since apiarists discovered it) the economically important mānuka (Fig. 9). These may also pollinate introduced members of the myrtle family, including eucalypts. Another group of solitary native bees specialises in matagouri. Two species of social bees have been introduced to pollinate lucerne crops, but these are not widespread and are unlikely to be encountered except in the few districts where lucerne is grown as a seed crop and the bee populations are managed. Honey bees, also introduced, are common throughout the country, and were widely naturalised until the varroa mite arrived (Fig. 10).

Fig. 7 The large garden (or ruderal) bumble bee (*Bombus ruderatus*), showing two yellow bands on the thorax (front and back), a single yellow band on the front of the abdomen and a white end band. Photo: © Catherine Beard, via NatureWatch NZ (http://naturewatch.org.nz/observations/4785614).

Fig. 8 The buff-tailed (or large earth) bumble bee (*Bombus terrestris*), showing a single yellow band on the front of the thorax, a dark yellow band half way along the abdomen and a white end band. Photo: © Catherine Beard, via NatureWatch NZ (http://naturewatch.org.nz/observations/4884356).

Fig. 9 Native bee of the genus Leioproctus on a mānuka flower. Photo: © Catherine Beard, via NatureWatch NZ (http://naturewatch.org.nz/observations/4906893).

Fig. 10 Honey bee (*Apis mellifer*) with an attached varroa mite (*Varroa destructor*). Photo: © Steve Kerr, via NatureWatch NZ (http://naturewatch.org.nz/observations/1601251).

Bumble bees are top pollinators for flowers with long tubes, such as foxgloves, beans, and red clovers, and I always make a point of leaving a few wild foxgloves to flower (Fig. 11). These are wonderful plants to attract bumble bees, which are not always as numerous as they might be. Honey bees pollinate white clover, but otherwise prefer flowers with flat or saucer-shaped corollas, such as the autumn-flowering showy sedum, *Sedum spectabile*, a doubly useful plant because its nectar-rich flowers also attract the native admiral butterflies. Several other autumn-flowering sedums have the same properties. All are tolerant of dry conditions. Bumble bees also flock to sedums.

Fig. 11 Foxgloves (*Digitalis purpurea*) grown in the authors' Hororata garden. Photo: Derrick Rooney.

Yarrows, both wild (Fig. 12) and ornamental, attract another native butterfly, the common copper (*Lycaena salustius*; Fig. 13). I counted more than 20 copper butterflies feeding on a single clump of wild yarrow last summer. Neither of these pretty butterflies will ever cause a problem in crops or gardens because the admiral larvae feed on nettles and the coppers on the native climbing muehlenbeckia. Clovers of all kinds, but especially the ornamental crimson clovers, *Trifolium rubens* (a perennial) and *T. incarnatum* (an annual), are also attractive to friendly insects, as are buckwheat and its perennial relative *Fagopyrum tataricum*, which spreads by stolons but has edible shoots readily controlled by grazing.

Fig. 12 Common yarrow (*Achillea millefolium*). Photo: Trevor James.

Fig. 13 The common copper butterfly (*Lycaena salustius*). Photo: Murray Dawson, via NatureWatch NZ (http://naturewatch.org.nz/observations/940910).

Goldenrod (*Solidago*; Fig. 14) and Michaelmas daisies (*Aster*) are useful ladybird hosts for autumn. It is also good to leave a few clumps of grass to grow long, as a refuge for beetles.

Fig. 14 Goldenrod (*Solidago canadensis*). Photo: Trevor James.

Dare I say it? Weeds are not all bad. Many provide safe havens for beneficial insects. Although several hundred species are listed as environmental weeds of New Zealand, and the subject of expensive control initiatives, some weeds help sustain beneficial insects and have other positive qualities.

Californian poppies (*Eschscholzia californica*; Fig. 15A–B), which light up several South Island riverbeds with ribbons of orange, yellow, and occasionally cream flowers, are magnets for bumble bees. Viper's bugloss (*Echium vulgare*; Fig. 16), which signals the arrival of Christmas with swathes and pools of blue in those same riverbeds, is manna from heaven for honey bees and other beneficial insects and yields a wonderful dark honey. Nodding thistle (*Carduus nutans*; Fig. 17), much maligned for its ability to spread and compete with pasture and crops, produces an abundance of nectar from its colourful, fragrant flowers and also makes a very fine honey. Even gorse (*Ulex europaeus*; Fig. 18) has a use. In late winter its precocious flowers are an invaluable source of the pollen that bees need at that stage of the season.

Fig. 15 Californian poppies (*Eschscholzia californica*). **A**, population growing wild on the Selwyn River bed, Canterbury. **B**, close-up of flowering plant. Photos: Murray Dawson, via NatureWatch NZ (http://naturewatch.org.nz/observations/5202091 and http://naturewatch.org.nz/observations/5202214).

Fig. 16 Viper's bugloss (*Echium vulgare*). Photo: Trevor James.

Fig. 17 Nodding thistle (*Carduus nutans*). Photo: Trevor James.

Fig. 18 Gorse (*Ulex europaeus*). Photo: Murray Dawson, via NatureWatch NZ (http://naturewatch.org.nz/observations/1013704).

Some crop plants have a secondary role as attractants for beneficial insects. The deep blue to purple-flowered fiddleneck (*Phacelia tanacetifolia*; Fig. 19), a native of Mexico and the southern United States, is recognised as an attractant for bumble bees, honey bees, native

bees, aphid-eating hover flies, and lacewings. This means it is doubly useful because as well as attracting pollinators it draws in predators that prey on some of the major plant pests.

Fig. 19 Fiddleneck (*Phacelia tanacetifolia*). Photo: Trevor James.

Species in the umbellifer family, Apiaceae, an economically important group that includes carrots, celery, chervil, coriander, fennel (Fig. 20), parsley, parsnips, and other well-known crop plants, herbs, and ornamentals including angelica, cow parsley, and lovage, are flower-friendly towards beneficial insects because they have shallow nectaries adapted to host nectar-feeders. Some toxic weeds including hemlock, wild parsnip, and the phytotoxic giant hogweed (*Heracleum mantegazzianum*) also belong in this family, but that shouldn't be held against it.

Fig. 20 Fennel (*Foeniculum vulgare*) growing wild on the Selwyn River bed, Canterbury. Photo: Derrick Rooney.

The umbellifer family has numerous indigenous representatives. Most notable, perhaps, is one of our iconic genera, *Aciphylla*, better known as 'wild spaniards' (Fig. 21). Other indigenous members of this family include a liane, New Zealand aniseed (*Scandia geniculata*)[3].

Fig. 21 Golden Spaniard (*Aciphylla aurea*), growing at Te Moana Gorge, Canterbury. Photo: Derrick Rooney.

Cow parsley has been used very successfully as an insect-friendly understorey in the shelter belts in the organic unit at Lincoln University, Canterbury. A form with blackish-bronze leaves, called *Anthriscus sylvestris* 'Ravenswing', is sometimes cultivated as an ornamental plant. Cow parsley is a self-seeding biennial, occasionally a short-lived perennial. Unlike several of its superficially similar but toxic relatives with which it can easily be confused, such as hemlock (*Conium maculatum*; Fig. 22), cow parsley is edible, though some say it has an unpleasant taste. I haven't tried it. Stock eat it, however, so it will not persist in places that are regularly grazed. Its favoured habitat is deep, rich, moist soil beside a ditch or on the fringe of woodland. It will not regenerate in a dry site. Wild carrot, also known as Queen Anne's lace (*Daucus carota*; Fig. 23), is similarly useful. It used to be a common roadside weed before the practice of keeping roadsides mown short took hold.

Fig. 22 Hemlock (*Conium maculatum*). Photo: Trevor James.

Fig. 23 Wild carrot or Queen Anne's lace (*Daucus carota*) growing on a roadside bank. Photo: Murray Dawson, via NatureWatch NZ (http://naturewatch.org.nz/observations/4770017).

The widespread availability of irrigation opens an opportunity to grow many of these potentially useful wildflowers along fencelines and the fringes of shelter belts. You should think carefully before adopting a scorched-earth policy on the margins of your lifestyle blocks, woodlots, shelter belts, ditches, and crops. Some weed spraying will always be necessary, if only to protect young plants against competition until they are big enough to fend for themselves. But wholesale spraying, even with non-residual herbicides, can have undesirable environmental

[3] *Scandia geniculata* is found in scattered North and South Island locations in coastal to montane bush and gorges. It used to be, and perhaps still is, a component of the rupestral shrubland in the Rakaia Gorge, and could be seen from the walkway, near the old Snowdon coalmine. This slender (some would say nondescript) vine can reach 3 m tall and is of particular botanical interest because it is one of very few climbing plants world-wide in this family.

and aesthetic consequences. Landowners who eliminate diversity from their roadsides by keeping them mown short, or who keep their boundaries and ditches bare by repeatedly applying herbicides, are depriving themselves of free and useful help from their friends. They are also, as has been discovered already, encouraging the evolution of herbicide-resistant weeds.

It's unrealistic to think that being friendly towards your invertebrate friends by growing insect-friendly grasses and weeds will solve all your pest problems. It won't. At best, encouraging the beneficial insects will reduce your pest problems by perhaps 30 to 40 per cent. Talk of anything better than that is pie in the sky because hover flies, lacewings, ladybirds, and other predators depend on a sustainable supply of aphids, caterpillars, and mites for their continued existence. But that 30 to 40 per cent can represent a big saving in costs. On farms or lifestyle blocks (and parks and gardens) you don't have to sacrifice big areas of good land to accommodate an insect-friendly understorey. Widening the space allowed for shelter fences by just one metre, from three metres to four, will accommodate these plants at the cost of just one hectare of land per 10 kilometres of fenceline. That seems a small price to pay for the probable economic and environmental benefits.

Acknowledgements
I thank Catherine Beard, Murray Dawson, Trevor James and Steve Kerr for providing many of the images used to illustrate this article.

References

Donovan, B.J. (2007). Apoidea (Insecta: Hymenoptera). Fauna of New Zealand 57. Manaaki Whenua Press, Lincoln.

Early, J.W. (1984). Parasites and predators. In: Scott, R.R. (editor): New Zealand pest and beneficial insects. Pp. 271–308. Lincoln University, College of Agriculture.

Websites (accessed December 2016)

NatureWatch NZ: http://naturewatch.org.nz

Te Ara – The Encyclopedia of New Zealand: Story: Wasps and bees: www.teara.govt.nz/en/interactive/11163/distribution-of-bumblebees