

Pollination Project: Site Selection and Transect Design

In choosing sites for the pollination work in your areas there are a few things you need to consider. The site needs to be roughly comparable to the one we already have data on in Nelson, and you need the transect arranged in a way that enables you to do the work effectively. The word “transect” is used loosely, and in this context refers only to the standard path you will take to get around your selected community of plants. Here are some guidelines on what to look for and how to set up your study site:

Choose an edge – It is impractical for the purposes of this study to monitor pollination at a canopy level where we would need to get high into the trees. It is much easier to find trees, shrubs and vines flowering at and below head-height on an edge. Our Nelson site uses both sides of a road edge along a ridgeline (Fig. 1). The highest flowers we attempt to monitor require no more than a collapsible two-step ladder, and we use that on only 2 or 3 plants in order to get a good close-up look.



Figure 1. The pollination site at the Grampians makes use of edges either side of a ridgeline road. Small flowering weeds such as catsear, lotus, and clover are found in the grassy verges and are included in our counts.



Figure 2. Over the middle part of the day, plants on both edges of the road are in sun.

It needs to get sun – Avoid dark, south-facing edges. The flowers and pollinators are more abundant in the sunny spots (especially bees and flies). The road at our Nelson site runs roughly North-South, so the edges are primarily East and West facing. One side is well lit in the early morning, the other in the late afternoon, but there are plenty of sunny bushes on both sides during a large part of the day (Fig. 2).

Keep away from gardens – We are trying to standardise (to some degree) site selection across the regions. In suburban areas there can be many flower gardens that have showy flowers throughout the year and can contain a range of plant species that are not naturalised (yet!). Such gardens may be acting as a sink or source for populations of important pollinators, particularly honey bees, bumble bees, and European drone flies. In order to reduce the influence of such artificial arrangements, try to select a site that is at least 1 km away from large areas of floral gardens. Some flowers around a farm-house a few hundred metres away is okay, but acres of decorative council gardens are not.

Site security – Avoid sites that are too public. The window traps we are using for background insect sampling are likely to attract attention and are expensive to replace. This will be an issue for the Nelson site, but access is via a locked gate and we are hoping that the runners, walkers, and mountain-bikers that make it to the top of the hill are not inclined to indulge in vandalism.

Mix of natives and weeds – Sites should contain a range of both native and introduced flowering plants, and can include groundcover plants such as clover as well as larger herbs, vines, shrubs, and trees. If the plant has a flower of interest to pollinators, we want it included in your transects! At the end of this document is a list of the plants that are currently included at Nelson (early spring flowers included). It is not possible to match all these species at the other locations, but we need some species in common: manuka, kanuka, and mahoe. There are indications that differences in flowering times over the latitudinal gradient means that mid November may be too late for manuka in the north, so the presence of kanuka takes priority. Mahoe may also be a problem, but some individuals of this species are flowering at a variety of times over the year, so although some trees may appear finished, others may just be starting.

Figure 3. Bruce and Ben at the Grampians site.



Transect design – Try to arrange your “transect” in a loop, so when you finish one count you are basically back in position to rest before starting the next count. Our Nelson transect runs up one side of the road and then down the other. If you have lots of flowers with many smaller beetles and flies requiring closer inspection to count, we find that about 40 plants is the maximum that can be counted over a 1.5 hour period (allowing for a little walking in between). Obviously if you have longer distances between plants, you won’t be able to do as many. The principle idea is to *get as many flowering plants in the transect as you can count over a 1.5-hour period*. Aim to get 3 plants of each species in your transect, but if that leaves some flowering species uncounted, then drop replicates for some of the smaller weeds in order to include more species. If, on the other hand, 3 of each species still leaves you with time on your hands and there are no more species to include, then add in more plants of each species (giving manuka, kanuka and mahoe first priority). Dioecious plants (such as mahoe) present a particular problem, because ideally we would like replicates of both males and females (3 of each), but this may be difficult to achieve given other limiting factors. In this case, give priority to having some of each sex (e.g. 2 females + 1 male is better than 3 + 0, but 2 +2 is better again). If a particular species is rare at your study site, don’t bother extending the transect a long way just to get another example of it. In setting up your transect think ahead: if a particular species looks like it is about to start flowering in a few days time, then leave time on your transect to add it in. If another species looks like it is about to finish, then you can plan to add in the about-to-flower species to replace it.

Selecting example plants – Choose the most flowery examples of each species for your transects, but in choosing multiple examples of a particular species you should also aim to spread them out around the loop (to avoid things like having all three close together and always in shade at the same hour of the day). You may find that some species are all clustered in one spot, in which case you just have to work with that arrangement.

Replacing plants – If one of your sample plants finishes flowering earlier than some other examples of the same species, you can abandon the non-flowering specimen and add in a better example to replace it. Just make sure that you note down the details of this change and that it is evident in the way data is recorded on the sheet (i.e. don’t use the same plant identifier number for a different plant).

Site description – The surrounding landscape needs to be described in order to establish the context in which the transect community exists. This may help to explain anomalies in comparing regional differences. Once you have established a transect and have GPS readings from its outer limits, we’ll try to obtain ortho photos of the site. Once these have been obtained you can mark on your own code letters for descriptions of major vegetation types that surround the area and provide a key e.g., A = dense gorse, B = mature broadleaf/podocarp forest (puriri, taraire, kohekohe, totara, kanuka, C = dairy pasture; etc

NELSON POLLINATION PLANT LIST

Native species

Manuka	<i>Leptospermum scoparium</i>
Kanuka	<i>Kunzea ericoides</i>
Mahoe (whiteywood)	<i>Melicytus ramiflorus</i>
Marbleleaf (putaputaweta)	<i>Carpodetus serratus</i>
Ngaio	<i>Myoporum laetum</i>
Kaikomako	<i>Pennantia corymbosa</i>
Five finger	<i>Pseudopanax arboreus</i>
Kohuhu	<i>Pittosporum tenuifolium</i>
Poroporo	<i>Solanum laciniatum</i>
Pohuehue	<i>Muehlenbeckia australis</i>
NZ Jasmine	<i>Parsonsia heterophylla</i>
Bush lawyer	<i>Rubus cissoides</i>

Introduced species

Barberry	<i>Berberis glaucocarpa</i>
Hawthorn	<i>Crataegus monogyna</i>
Gorse	<i>Ulex europaeus</i>
Broom	<i>Cytisus scoparius</i>
Woolly nightshade	<i>Solanum mauritianum</i>
Banana passionfruit	<i>Passiflora tripartita</i>
Climbing asparagus	<i>Asparagus scandens</i>
Foxglove	<i>Digitalis purpurea</i>
Woolly mullein	<i>Verbascum thapsus</i>
Straw flower	<i>Helichrysum bracteatum</i>
Californian thistle	<i>Cirsium arvense</i>
Lotus	<i>Lotus pedunculatus</i>
Catsear	<i>Hypochoeris radicata</i>
Pale flax	<i>Linum bienne</i>
White clover	<i>Trifolium repens</i>



Figure 4. Mixed native and weed species growing at the Grampians. The white flowers on the left are hawthorn, the yellow are barberry.