



ARGOS RESEARCH NOTE: NUMBER 17, NOVEMBER 2006

Bird Sampling Methods

Gathering biodiversity information

ARGOS seeks to document and compare whole-farm sustainability between farming sectors and management approaches. One of the first steps towards this objective is to complete baseline surveys of the diversity of plants and animals present on all farms and orchards. In other words, to compile an inventory of the environmental resources we have to work with. Baseline surveys will allow for the refinement of monitoring methods and the selection of 'focal species' for efficient long-term monitoring. Surveys for plants, soil biota, terrestrial and freshwater invertebrates, fish, frogs, lizards, birds, bats and terrestrial mammals are planned for all farms and orchards in the ARGOS project. This research note explains the methods used to survey bird abundance and determine community composition.

Bird surveys

We chose to survey birds because (a) they are good indicators of wider ecosystem health and functioning; (b) they are generally well recognized and familiar to farmers, consumers, politicians and the public; and (c) some species have potential as indicators of good farming system practices for increased farm produce market access.

Different management practices have been shown overseas to affect bird abundance

and diversity, but this has not been investigated in New Zealand. We counted birds on three different farming systems (certified organic, Integrated Management (IM) and conventional) in two sectors (sheep/beef and kiwifruit) in the summer of 2004/05 (see ARGOS Research Note 1 for details of the study design).

Counting birds

In most cases it is not possible to count every plant or animal on a farm or orchard. Instead, a survey is usually carried out, where the animals seen are considered to be a smaller sample of the total population. The problem is then trying to work out what proportion of the total population your sample is. That is, how do you know how many animals you have missed? Our answer to this problem is to use "distance sampling" methods, where the observers note how far away from their survey line each bird is. From this a measure of "detectability" for each species in different habitats can be worked out, and from this, how many birds per hectare are present. Surveys took a full day on the sheep/beef farms and just over half a day on the kiwifruit orchards. During the surveys, each observer carried a pair of binoculars and bird identification sheets to aid in bird identification, and a laser range finder to determine the distance of the bird from the survey line.

We also used a second bird survey technique, the five-minute bird count. In this relatively simple method of surveying birds, all birds seen or heard over a five minute period are counted at all sites.

The pros and cons of our methods

The greatest difficulties we experienced in the surveys resulted from team members' initial lack of expertise in identifying different bird species. However, training and experience helped overcome this difficulty. Bird monitoring proved workable, cost effective and obviously of interest to participating farmers, so it will become part of regular biodiversity monitoring on ARGOS farms and orchards.

Birds in different habitats

We compared the number and type of birds counted on ARGOS kiwifruit and sheep/beef farms with the number counted by other researchers in native forest, scrub and pine forests elsewhere on mainland New Zealand. We found that ARGOS sheep/beef and kiwifruit orchards had remarkably high bird counts if all bird species are combined (Figure 1). Bird counts on orchards and farms were significantly higher and there were more species present than in native bush, pine plantations and scrub on public land. The majority of the farm and orchard species were introduced finches and song birds. Overall, this study showed that (a) the majority of farms do not at present sustain a high diversity of native birds species, but (b) they generally support a wide range of introduced species and (c) the abundance of birds in production landscapes is relatively high compared to in native habitats on public reserves. (Birds in different farming systems are studied in more detail in research notes 18 and 19). This research places the birds found in production landscapes into the wider New Zealand context and has shown us which species we have to work with on our study farms.

Where to next?

These studies will provide important baseline information on the bird communities present on ARGOS farms. It

also raises several questions that will be addressed in the coming years of the project. Including:

- What is the role of habitat in determining species presence and abundance?
- How do different farming systems and particular farmer actions affect bird communities?
- What are the beneficial or negative effects of different introduced and native birds in production landscapes?
- What actions are required to increase and sustain native birds on farmland, what might they cost and provide for farmers, and what are the costs and benefits of these actions for wider society?

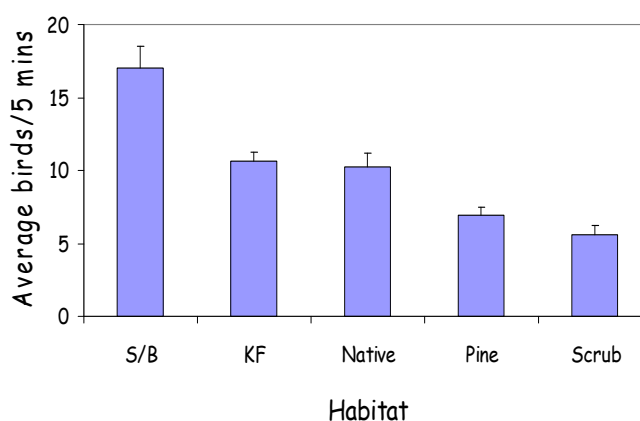


Figure 1. Average bird counts on sheep/beef farms (S/B) kiwifruit orchards (KF), and on public native bush (Native), pine plantations (Pine) and Scrub.

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