activity was based on 12 months of post-fire data. We did not treat each sample period within each combination as a replicate, as in one case we only had one sample period prior to the burn. We tested for an effect of the burn on ant abundance by examining the interaction term.

Nesting preference

Nest densities were quantified for *M. turneri perthensis* and *R. inornata* in 1 m grid cells of a 0.04 ha plot at Dwellingup; nests of *R. violacea* were not found in this plot. These densities were then compared to the frequency of ground cover and overstorey shade categories at the site. Nest location preference for each species was tested separately using a chi-square test.

Nest structure and depth

The structure and depth of nests was assessed by lead casting. Lead was liquefied in a crucible and poured into nest entrances, then allowed to cool and solidify. The resulting caste was dug up, cleaned in water, photographed and measured, thus enabling structure and depth to be obtained. Five nests each of *R. inornata*, *R. violacea* and *M. turneri perthensis* were assessed from laterite at Karragullen or Dwellingup and a further five nests of *M. turneri perthensis* were assessed from sands at Yalgorup.

Colony size

During the peak summer activity period, five nests each of *R. inornata* and *R. violacea* were excavated from the Karragullen site and the soil was passed through a stack of sieves of progressively decreasing mesh size. Ants were separated from the soil by floatation, and counted. We lacked comparable data for *M. turneri perthensis,* so five nests of this species were sampled from an equivalent area of sand plain in Perth during the summer of 2009. Our continuous observations on these species over the previous 30 years have not revealed any change in the ecology of these species, so the discrepancy in sampling time is not considered likely to influence these particular measurements.

Feeding habits

At Karragullen, five nests of each species were observed for 30-min periods monthly between April 1978 and April 1979. All ants observed carrying food items were collected and the food was removed and identified to the best level possible.

Diet composition was further measured at Karragullen by scraping the soil middens from around nest entrances of the three species and separating the organic material from the soil by floatation in saturated magnesium sulphate. The number of middens sampled was dictated by the number of suitable nests that could be found, consequently, the number varied from three (*R. inornata*), through five (*R. violacea*) to 10 (*M. turneri perthensis).* The seeds and arthropod fragments from this organic material were identified and counted.

Foraging response to seed availability

During the period February 1978–April 1979, plant flowering phenology was monitored monthly at the Karragullen site. In each month, the species of flowering plants were recorded over a 1.2 ha area (see Majer, 1980a for further details). We divided the plant species into myrmecochores and non-myrmecochores and tested for correlations between ant activity and species richness of flowering myrmecochores in each month. As we were particularly interested in the correlation between ant activity and myrmecochore seed-rain, we tested for a correlation between the two with various lag periods (1, 2, 3 and 4 months). We tested for the correlation using data for the three ant species separately. We also tested for variation in flowering phenology of myrmecochore and non-myrmecochore plant species using the statistical technique described by Estabrook et al. (1982) (see also Guitián and Garrido, 2006).

Seedling emergence from nests

Since many local plant species require fire to stimulate germination, the effects of fire were simulated over 10 *R. inornata* and 15 *M. turneri perthensis* nests near Dwellingup, during winter, 1979. Fire was simulated by inverting a Pyrox Schwank® infra-red gas heater over the nest and heating the soil to 100°C at 2 cm depth for 30 min. An equivalent area of bare soil 1 m from the nest was also heated and a further set of unheated nests and nearby soil were also marked out. Seedling emergence was recorded in the marked out areas over the next 2 months.

Results

Seasonality of foraging

Across the periods sampled, *Rhytidoponera* spp. and *Melophorus* monthly activities were positively correlated with each other in only two of the six locations, Karragullen and Reabold Hill ($P = 0.025$, $P < 0.001$, $Rho = 0.576$ and 0.868, respectively).

Melophorus turneri perthensis showed significant seasonal variation in activity ($F_{11,70} = 4.462$, $P < 0.001$; Fig. 3c). Both *Rhytidoponera* spp. followed a similar seasonal pattern in activity (Fig. 3a, b), but this was not