occur later in the season and are often more severe. Different fire regimes are known to have important influences on the bird (Woinarski 1990) and lizard (Braithwaite 1987) faunas of Kakadu, but there have been no studies of their effects on invertebrates.

STUDY SITES

The predominant vegetation types in the Kakadu region are heavily wooded savannas dominated by species of *Eucalyptus* (Braithwaite & Estbergs 1985, Taylor & Dunlop 1985), as is the case for much of northern Australia (Gillison 1983, Mott *et al.* 1985). Rainfall is highly seasonal, with 80 percent of the annual mean of 1000–1400 mm falling between December and March (Taylor & Dunlop 1985). Compared with tropical savannas elsewhere in the world, vertebrate biomass is exceptionally low, and invertebrates in general assume far greater functional importance (Mott *et al.* 1985, Andersen & Lonsdale, 1990).

The study was conducted at an experimental fire site at Munmarlary (12°28′S, 132°30′E), which was established jointly by CSIRO and the Conservation Commission of the Northern Territory (CCNT) during 1972 (Hoare *et al.* 1980). The site consists of a series of replicated treatment plots with annual, biennial, and fire-exclusion (unburned) burning regimes. The plots are each 1 ha, and located within a total area of approximately 20 ha. The vegetation is an open forest of *Eucalyptus tetrodonta* and *E. miniata* over a tall grassland of annual *Sorghum intrans* on well-drained, sandy loam soils, and is described in detail by Bowman *et al.* (1988). There are some fire-induced floristic differences between plots, but the major effect of fire regime on vegetation has been structural, with unburned plots having far greater mid-story development (predominantly *Acacia* spp. and *Erythrophleum chlorostachys*) than all others (Fig. 1; Bowman *et al.* 1988). Such mid-story development is a feature of unburned savannas both in Australia (Stocker & Mott 1981) and elsewhere (Kellman & Miyanishi 1982, Gillon 1983).

METHODS

Ants were studied in six plots, representing two replicates of each of three fire regimes. The plots will subsequently be referred to as A1 and A2 (burned annually), B1 and B2 (burned every two years), and C1 and C2 (unburned). The CCNT codes for the plots were B1P2, B2P2, B1P3, B2P3, B1P4 and B3P4, respectively. All fires were lit early during the dry season (May/June).

In each plot, ants were sampled using 20 pitfall traps (5 cm diameter), located in a 5 × 4 grid with 10 m spacing. Traps were partly filled with a 70 percent ethanol-glycerol mixture as a preservative, and operated for 48 hr from 9–11 June 1986. Two traps in plot A1 were disturbed and consequently excluded from analysis. The weather was dry throughout, with temperatures ranging from 15 to 31°C.

Results from similar sites elsewhere in Kakadu show that trapping at this intensity provides a good indication of the relative abundance of the major ant species on the ground (Andersen, in press a). Pitfall trapping is not so effective for cryptic species, and of course does not sample arboreal species. Moreover, catches are influenced by the structure of ground vegetation and litter (Greenslade 1964), with catches likely to be disproportionately lower in areas of heavy litter (*i.e.,* unburned plots). When comparing catches from different sites, it was therefore necessary to consider the relative as well as absolute abundances of species in traps.

Ants were sorted to species level, but most species were unable to be named with certainty due to the generally poor species-level taxonomy of Australian ants. Unnamed species within a genus were distinguished by a number code following, and extending where necessary, the nomenclature of Andersen (in press a, b). A complete collection of voucher specimens is held at the CSIRO Tropical Ecosystem Research Centre in Darwin.

The great diversity of ants collected, combined with an absence of information on their specific biology, made it impractical to interpret their responses to fire at the species level. Both these problems were overcome by assigning species to functional groups according to their habitat requirements and competitive interactions, based on studies of related species elsewhere. This functional group scheme was originally derived by P. J. M. Greenslade from studies of the Australian arid zone (Greenslade 1978, Greenslade & Halliday 1983), but has since been widely applied elsewhere in Australia (Greenslade & Thompson 1981, Greenslade 1985, Andersen 1986). The groups are as follows:

1. Dominant species (*Iridomyrmex* spp. throughout most of Australia, but also *Oecophylla smaragdina* in tropical regions), which are highly abundant and aggressive ants having a strong competitive influence on other species. *Iridomyrmex* is especially abundant in open habitats, where high levels of ground insolation and unimpeded foraging