

VEHICLES AS VECTORS OF WEED SEEDS IN KAKADU NATIONAL PARK

W.M. Lonsdale and A.M. Lane
CSIRO Division of Entomology, P.M.B. 44,
Winnellie, N.T. 0821.

Summary. A total of 1511 seeds from 84 species, many alien to the region, were collected from 222 tourist vehicles travelling in Kakadu National Park. In September and October, around 70% of vehicles were carrying seeds.

INTRODUCTION

The number of naturalized alien plants in the Kakadu region has increased at the rate of 1.6 species per year since 1948 and now represents 5.3% of the region's flora (1). This rate of increase is quite small compared with other parts of Australia (c.f. 2), but may accelerate with the swelling numbers of tourists visiting the park. In 1984, for example, 75 000 visitors entered Kakadu, compared with 230 000 in 1989. Wace (4) has demonstrated that cars carry large numbers of seeds, and the increase in traffic obviously has implications for weed control. We report here some preliminary results from samples of the seeds carried by tourist vehicles entering Kakadu between May and November 1989. The sampling continues until June 1990.

METHODS

Sampling was at roughly monthly intervals, from May 1989. Each month, all tourist vehicles parked during a two-day period at the campsite of the Kakadu Holiday Village, on the western entry route to the Park, were sampled for weed seeds. Samples were also taken at the Coinda Hotel, on the southern entry route. The air intakes and outer surfaces of the car bodies were vacuumed, and the contents of the vacuum emptied into plastic containers after each sample. Samples were brought back to the laboratory, where they were separated into their constituent species, and counted.

RESULTS AND DISCUSSION

After the November sampling, 84 different species had been found on the 222 cars sampled. The number of cars using the campsites was at a peak in August, the mid-dry season, but the percentage of cars carrying seed was at its height in September and October, at around 70% (Fig. 1). The total number of propagules collected on each sampling date was generally between 10 and 100, while the average per car lay between 1 and 10 (Fig. 2). The October figure was anomalously high, because of the presence of a large fruit of *Brassica* sp. in one car. Indeed, 80% of the propagules found so far came from just seven species (Fig. 3 ; Table 1).

There was no apparent flattening of the species accumulation curve by the final sampling date in November (Fig. 4), although on subsequent sampling dates, the volume of traffic dropped dramatically, presumably because of the hot humid weather leading up to the wet season (W.M. Lonsdale and A.M. Lane, unpublished results). Most of the species (63 %) are grasses, but many remain to be identified, and their weed status evaluated. No propagules of the two major threats to Kakadu, *Mimosa pigra* and *Salvinia molesta*, were found.

Table 1. The seven species which constituted 80% of the seeds carried on the outside of 384 cars visiting Kakadu National Park between May and November 1989.

Species	Family	Total number of propagules
<i>Brassica</i> sp. ¹²	Brassicaceae	479
<i>Hordeum hystrix</i> ¹²	Poaceae	291
<i>Datura ferox</i> ¹²	Solanaceae	184
<i>Aristida inaequiglumis</i> ²	Poaceae	144
<i>Bothriochloa</i> sp. ²	Poaceae	53
<i>Tridax procumbens</i> ¹²³	Asteraceae	28
<i>Heteropogon contortus</i>	Poaceae	25

¹Species alien to Australia; ²Species alien to Kakadu;

³Species known globally as a tropical weed or (3) as a weed of tropical Australia .

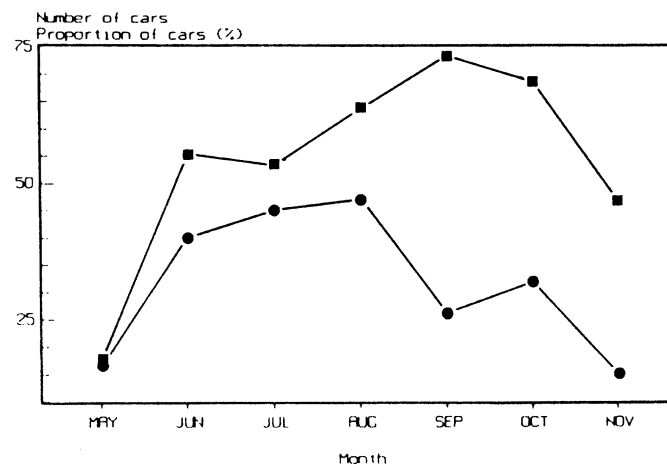


Figure 1. Number of cars sampled (●) and proportion of cars (%) with seed (■).

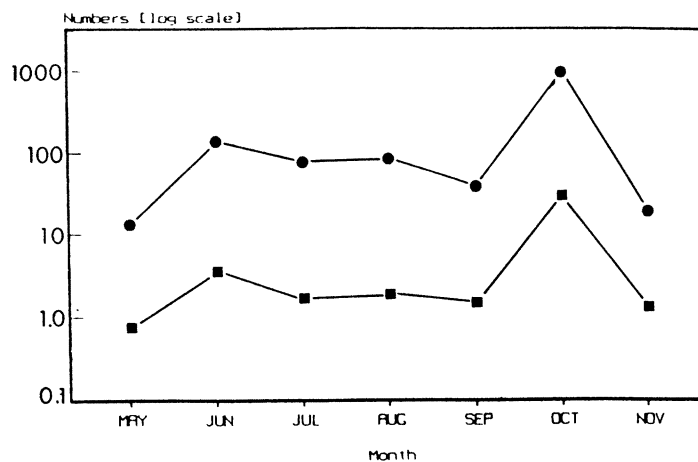


Figure 2. Total number of propagules collected each month (●), and mean number of propagules per car (■).

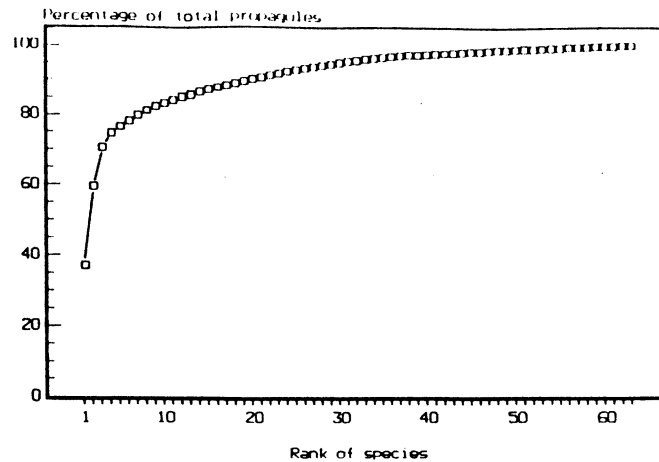


Figure 3. Cumulative proportion of total propagules contributed by species ranked in descending order of abundance.

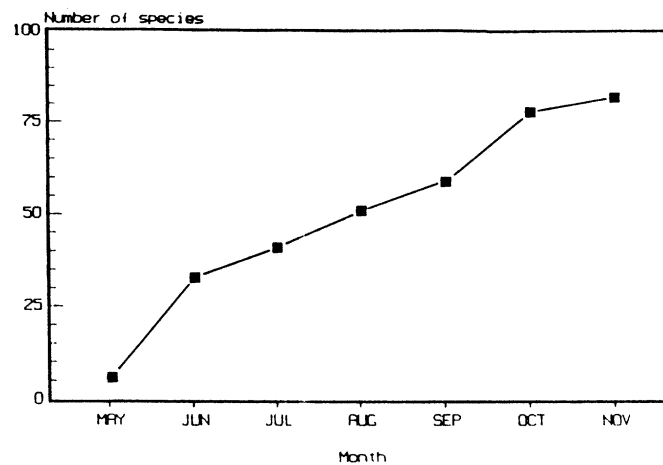


Figure 4. Time course for the cumulative number of species carried as propagules on tourist vehicles into Kakadu.

There is then no doubt that seeds of species alien to the Kakadu region, some of them known tropical weeds (Table 1), are being brought into the Park by tourists' cars. The management implications would depend on the rate at which seeds are deposited from cars onto suitable sites for establishment. No data are yet available on this, but it seems reasonable to argue that driving off roads and marked tracks should be restricted as far as possible.

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