FAUNA

DUNG BEETLES

by Ian Dadour

As you wave 'the Australian salute' this summer, think about how many more bush flies there would be without dung beetles!

THE ancient Egyptians thought that beetles rolling dung represented what was happening in the heavens. The Earth was the ball of dung and the beetle was the sun, turning the Earth over and over. The legs of the beetle represented the rays of the sun.

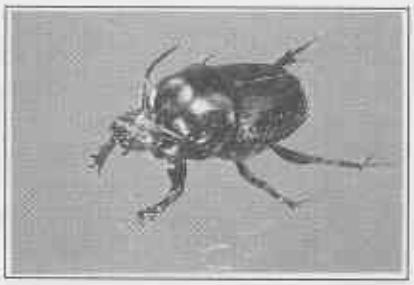
Ancient Egyptians thought highly of the dung beetle, and so do many Australians, but for a number of different and more practical reasons such as the removal of pasture fouling and the reduction of the bush fly.

In 1964 the dung beetle program was initiated in Australia by CSIRO and the first beetles (mostly summer species) were released in 1968. The major aims of the program were to remove pasture fouling (by dung burial) and to control (by competition) the buffalo fly, *Haemotobia irritans*, and the bush fly, *Musca velutissima*. Both species of fly spend their larval stage in dung. Bush flies utilise all types of dung, and large amounts became available following European settlement and the introduction of stock.

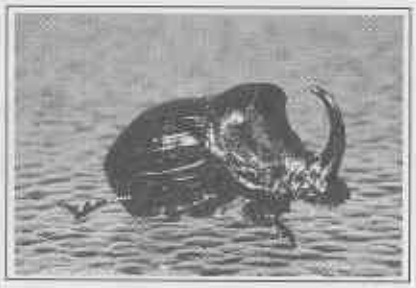
Although native dung beetles are present in natural vegetation in the south-west, they normally feed on the faecal pellets of marsupials, and dung from cattle, sheep and horses does not suit them. This imbalance, caused by an accummulation of dung, led to an increase in the breeding sites of the bush fly. Introduced dung beetles, on the other hand, do not utilise marsupial dung, it is too hard.

The dung pads of cattle dry hard and remain in the pasture for months or even years. Cattle will not graze in the immediate vicinity of a pad unless desperate, so farmers lose a significant amount of grazing land. This means reduced stock numbers and lost income. To increase the breakdown of cattle dung in pastures, between 1972 and 1986 CSIRO released 14 species of dung beetle from Europe and Africa into south-west WA. Nine species are known to have established and seven species are common. They are now the dominant members of the dung beetle fauna in pastures.

Dung Beetle *Onthophagus alexis* - native south-west



Dung beetle *Onthophagus taurus* - summer active introduced early 1980's



Dung beetle *Copris hispanus* autumn/ spring active. Introduced late 80's early 90's

Dung beetle activity improves pastures in several ways. Firstly, increasing the breakdown of cattle dung decreases the amount - and therefore the cost - of harrowing needed. Secondly, nutrient recycling by dung burial increases pasture productivity. Thirdly, it reduces the numbers of gastroenterinal worms, which normally spread from dung pads to surrounding grass and thus reinfect grazing cattle. Finally, the numbers of both buffalo flies and bush flies are reduced.

The larvae of both buffalo flies and bush flies breed in dung. They are pests of both livestock and humans, spreading diseases such as 'pink eye' in cattle. When beetles are abundant in a dung pad they compete with the flies, which are then killed because there is insufficient dung for them to complete their life cycle. The buffalo fly requires a blood meal before laying its eggs, and this biting causes a reduction in meat and milk production. The bush fly also pesters livestock (and humans!), obtaining protein for egg production from tears, nasal mucus or blood from a wound. This feeding activity may also cause a reduction in meat and milk production in cattle, though this is, as yet, unproven.

From 1989 to 1996, AgWA and CSIRO introduced two species of dung beetles from Spain, specifically to try to control bush flies. The project was also supported by the Dairy Research Development Corporation. These beetles are active from September to early January, and fill a different seasonal niche from the previously-released summer-active species. They were released at 500 sites, and have become established at 28. As far as bush-fly numbers go, it will be a long time before we feel the effect of these new dung beetles.

During the last three years, a project supported by Healthway has determined that bush flies are vectors of both trachoma and salmonella in the Kimberley and Goldfields. Dung beetles have been introduced to these remoter areas to try to reduce bush fly numbers.

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Good news!

Calibrated fly traps used by AgWA and CSIRO between 1977 and 1995 have shown a dramatic decrease in bush fly numbers, caused by the activity of introduced dung beetles:

- ▷ 90% reduction in January in Busselton / Margaret River area
- ▷ 65% reduction in the Bunbury area
- ▷ 60% reduction in the Perth and Albany areas.

The future of introduced dung beetle populations remains assured, as long as there are cattle and horses in the south-west of WA. It would be of particular importance and good government foresight if, ten years from now, some research on the post-evaluation of dung beetles' dispersal and bush fly abundance should take place.

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