

### Seed dispersal by tapir in southeastern Brazil

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Tapirs are selective feeders known to include a prodigious amount of fruit in their diet (Bodmer 1990, 1991; Janzen 1982*a,b*, Terwilliger 1978). Although known to destroy some seeds that they swallow, tapirs are considered as important seed dispersers for those plant species which can pass unharmed through their gut (Bodmer 1991).

The tapir (*Tapirus terrestris*) occurs east of the Andes from North Colombia to South Brazil and North Argentina and Paraguay (Emmons 1991). In Southeastern Brazil it occurs only in a few reserves.

During a study of the dispersal of seeds by vertebrates in the Atlantic forest of Southeastern Brazil we analysed the contents of two tapir dungs. The study site is the Fazenda Intervals, a 38,000 ha forest reserve in southern São Paulo state, Brazil (22° 11' S, 48° 32' W). The area is covered by evergreen cloud forest and has been described briefly elsewhere (Olmos 1991).

One dung was composed of the undigested remains of leaves and twigs of a *Chusquea* bamboo and about 300 seeds of the palm *Euterpe edulis* (Palmae) and 100 seeds of the nutmeg *Virola oleifera* (Myristicaceae). Twenty randomly selected seeds of each species were washed and allowed to germinate in wet sand under room light and temperature. Twenty *Euterpe* and six *Virola* seeds picked from the trees received the same treatment and represented controls. The second dung was composed by seeds of *Maytenus* spp. (Celastraceae) and leaves and twigs of the giant bamboo *Guadua angustifolia*. We did not conduct germination test with *Maytenus* seeds.

*Euterpe* seeds swallowed by tapir had a low germination success (45%), compared to the 85% of the control. *Virola* seeds from the tapir dung also had a 45% germination success. Only 33% of the control group germinated but the sample was considered too small to be compared to the germination of ingested *Virola* seeds. The seeds found in the tapir dung coincide with the peak of the fruiting season of *Euterpe* and *Virola* (September) at Fazenda Intervals. These species are consumed by a large assemblage of frugivores (R. Laps unpubl. data, pers. obs.). *Euterpe* fruits are dispersed mainly by large birds, such as guans, toucans, and cotingas (R. Laps unpubl. data). Rodents and parrots are amongst their principal seed predators (Galetti *et al.* 1992*a*, Galetti and Peres in press.). Squirrels (*Sciurus ingrami*) also eat and probably disperse *Euterpe* and other palm seeds (Galetti *et al.* 1992*b*). All *Virola* species are dispersed chiefly by birds, especially toucans, and to a lesser extent by monkeys and agoutis (Forget and Milleron 1991, Howe 1981, 1983). This is the first record of a tapir eating and dispersing *Virola* seeds. It appears as if the dispersal of *Virola* and *Euterpe* fruits depends mainly from birds, and only opportunistically from tapirs.

*Mammalia*, t. 57, n° 3, 1993.

The palm *Euterpe edulis* can be dispersed by a large assemblage of *Euterpe* have a thin epicarp and probably Tapirs, however can be important to reach the highest rate of seed predation (Janzen 1970).

*Virola oleifera* can be considered fruits every two years. These are dispersed case tapirs are important in dispersing

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**Acknowledgements.** – We thank the FMB/FUNCAMP for providing logistical and germination test. The seeds were identified by R. Laps and W. Crampton for comments. CAPES, CNPq, and The British Council supported this work. CAPES and CNPq.

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## Eastern Brazil

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The palm *Euterpe edulis* can be considered an "r" strategist species and its fruits are dispersed by a large assemblage of frugivores as well as by water. The seeds of *Euterpe* have a thin epicarp and probably suffer damage in the digestive tract of tapir. Tapirs, however, can be important to remove the seeds near the parental tree, the site of the highest rate of seed predation (Janzen 1970).

*Viola oleifera* can be considered a "K" strategist species. It produces only a few fruits every two years. These are dispersed by a specialised guild of frugivores. In this case tapirs are important in dispersing fruits that were missed by canopy birds.

Neotropical ungulates are known to be mainly seed predators, but tapirs can be important in the seed dispersal of small or hard nuts (Bodmer 1990, 1991).

*Acknowledgements.* - We thank the Fundação Florestal do Estado de São Paulo and FMB/FUNCAMP for providing logistical support. C. Olmos-Neves and F. Neves cared for germination test. The seeds were identified by J. Semir and H.F. Leitão-Filho. We acknowledge R. Laps and W. Crampton for comments on the manuscript. M. Rodrigues was supported by CAPES, CNPq, and The British Council; F. Olmos by CNPq; and M. Galetti by FAPESP, CAPES and CNPq.

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