

**Weevil**  
**Pollination of**  
**the Australian**  
**Cycad**  
***Lepidozamia***  
***peroffskyana***

*Implications for the*  
*antiquity of insect*  
*pollination.*

**ILLUSTRATED**  
**ABSTRACT**

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Experiments carried out to investigate the reproductive ecology of the Australian cycad *Lepidozamia peroffskyana* revealed that this species is pollinated exclusively by host specific *Tranes* weevils.

*Lepidozamia peroffskyana*



*Tranes* Weevil



The weevils carry out their life cycle within the tissues of the male cones but also visit the female cones in large numbers.

**Weevils gathering on the surface of the male cone. I have collected more than 700 of them from a single male cone. The adults feed on cycad pollen and the larvae develop in the tissues.**

Female cones from which insects (but not wind) were excluded had a pollination rate that was essentially zero. In contrast, female cones from which wind (but not insects) were excluded had a pollination rate comparable with naturally pollinated cones.



**Average % Pollinated Seeds in the Cone.**

**Wind Exclusion**

(bag) n = 9

**70.3%**

**Insect Exclusion**

(netting) n = 8

**0.1%**

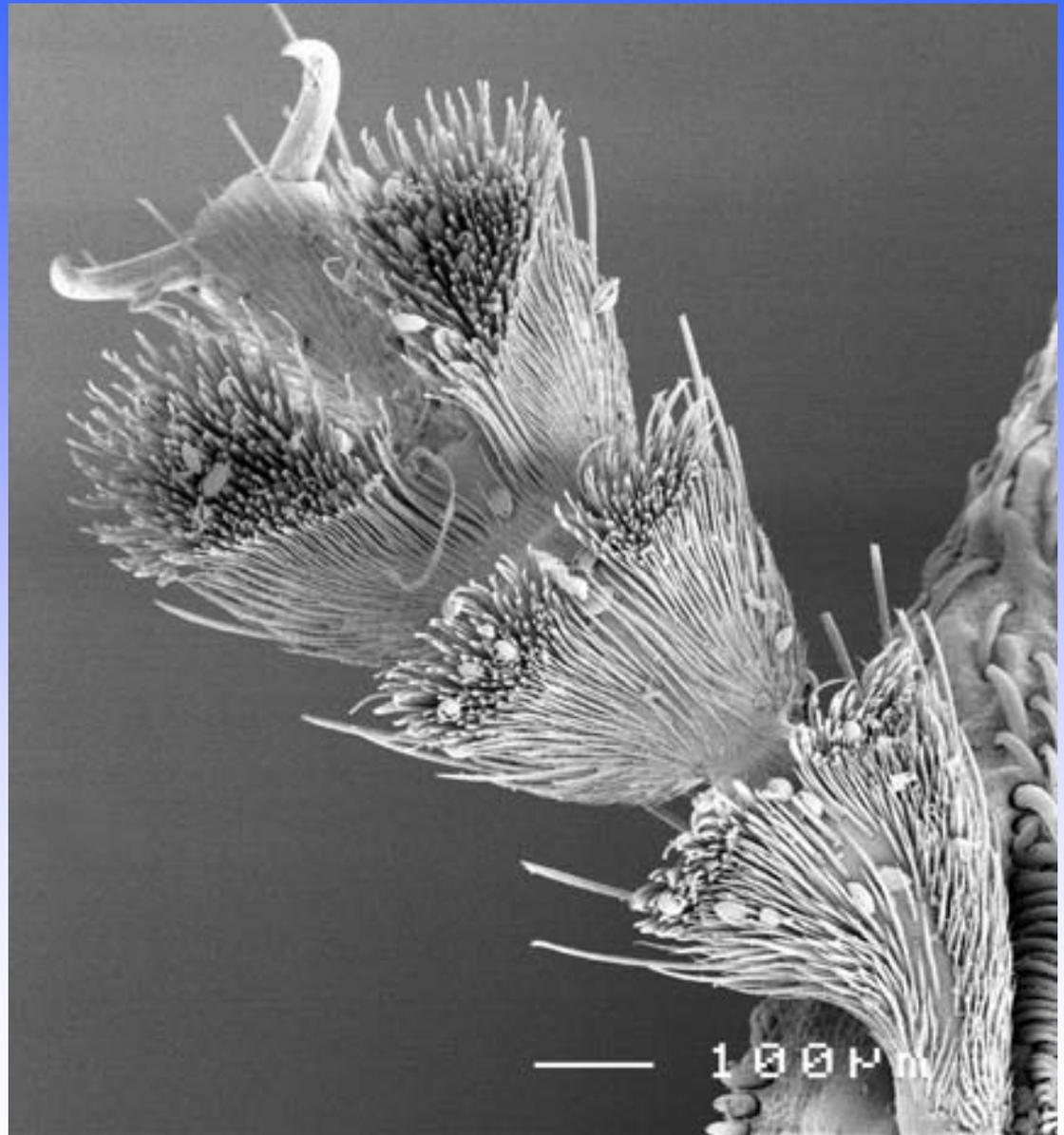
**Control Treatment**

(undisturbed) n=8

**83.9%**

Assessment of *Tranes* weevil pollen load indicated that they are effective pollen-carriers. No other potential insect pollinators were observed on cones of *L. peroffskyana*.

**Clawed foot of a *Tranes* weevil showing transport of cycad pollen. The pollen resembles grains of rice caught up among the leg hairs.**



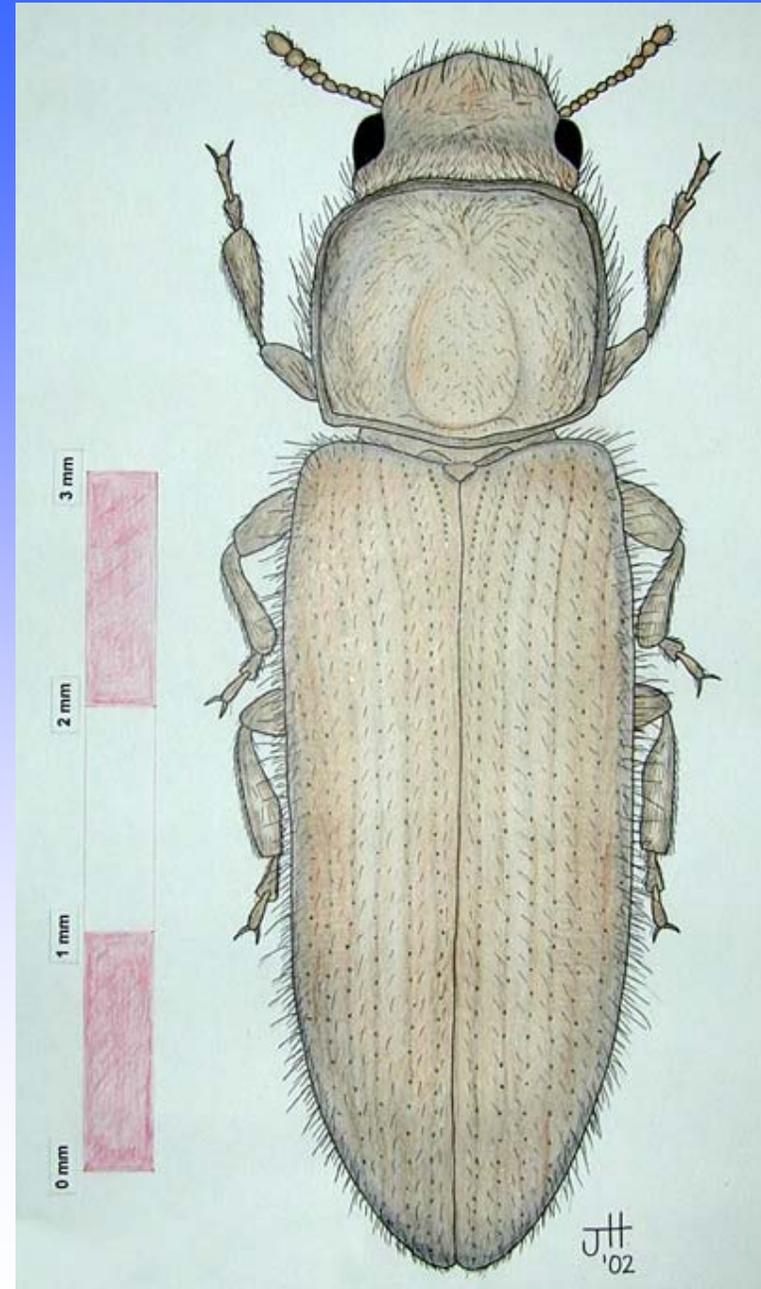
The airborne load of cycad pollen in the vicinity of pollination-receptive female cones was minimal, and the spatial distribution of the coning population indicated that receptive female cones did not usually occur close enough to pollen shedding male cones for airborne transfer of pollen to explain observed natural rates of seed set.

**Airborne pollen traps  
surrounding a female cone**



These multiple lines of evidence suggest that wind - once considered the only pollination vector for cycads and other gymnosperms - plays only a minimal role in the pollination of *L. peroffskyana*, if any at all. The global diversity of insects associated with cycads suggests that some lineages of pollinating beetles may have been associated with cycad cones since Mesozoic times.

***Hapalips* sp. a languriid beetle associated with pollination of the Australian cycad *Cycas ophiolitica*. Beetles in the same sub-family are associated with cycad pollination in South Africa, South-East Asia and Central America - a Jurassic Biogeography?**





## **For More Information...**

Pollination Ecology of the Australian Cycad  
*Lepidozamia peroffskyana* (Zamiaceae)

J. Hall, G. Walter, D. Bergstrom and P. Machin.

Australian Journal of Botany, 2004, Vol 52 p. 333-343.