

INSECT-ASSISTED POLLINATION OF PEANUT FLOWERS:

AN UNTAPPED ECOSYSTEM SERVICE ?

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INTRODUCTION:

Flowers of peanut (*Arachis hypogaea* L.) are primarily self-fertilised but reports from the USA and Egypt show that peanut yields are increased if bees from the families Halictidae, Megachilidae, Apidae or Bombidae visit the flowers and trigger pollen release.

AIMS:

We aimed to discover:

- whether bees in peanut crops on the Atherton Tablelands are providing this service and
- whether tropical rainforest is a source of bees capable of tripping peanut flowers.

METHODS:

Seven peanut crops, three within 500 m of tropical rainforest and four 5-10 km from rainforest, were chosen for the study. Three treatments were set up at each site (Fig.1) :

- bee excluded - plants enclosed in a mesh cage to exclude insects honeybee-sized and larger,
- partly caged - plants in a cage with mesh on top only to allow bees access and test for cage effects
- control - plants inside a cage frame without mesh.

Cages were approximately 1 m square and 1 m high

We also used intercept traps to collect bees from the crops for the duration of the flowering period. After harvesting we used paired t tests to compare number of nuts/peanut plant between treatments at each site.

Fig. 1



i) bee excluded



ii) partly caged

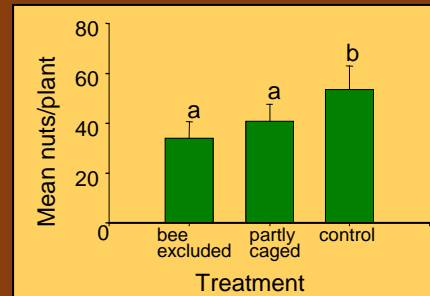


iii) control



Arachis hypogaea L.

Fig. 2



Nuts/plant for each treatment

RESULTS:

Peanut yields were significantly lower in bee excluded ($P = 0.003$) and partly caged ($P = 0.03$) treatments compared with control treatments. There was no significant difference in yield between bee excluded and partly caged treatments (Fig. 2).

We trapped four species of bee large enough to trip peanut flowers. No species was abundant (max. 2 individuals/site/total collection time). Only one, a *Nomia* sp. (Halictidae), occurred exclusively in fields near tropical rainforest. An *Amegilla* sp. (Apidae) was found both near and far from rainforest. A species of Megachilidae and the introduced honeybee (Apidae) occurred only in fields far from rainforest.

DISCUSSION:

The lack of a difference in yield between bee excluded and partly caged plants means that the reduction in yield in the two treatments, compared with the control, was due to cage effects rather than the absence of bees. The cage mesh could have reduced yields by shading plants or inhibiting enhancement of pollen release by strong wind or by the impact of irrigation water applied from above. Assuming that native bees were associated with the kind of vegetation near each crop site, only the *Amegilla* and *Nomia* spp. are likely to be harboured by tropical rainforest.

CONCLUSIONS:

It is possible that peanut varieties grown on the Atherton Tablelands do not benefit from bees visiting their flowers but, given the low abundance of suitable bees in the crops, it seems more likely that the current crop environment does not attract bees in sufficient numbers to have a measurable impact on pollen release. Managing crops to increase bee visitation to peanut flowers could result in higher yields.