

Just imagine a world without the colourful display of flowers. Their joyful effect is not always acknowledged but would certainly be missed. However, the bright and shiny colours of many flowers are not designed by nature to make us happier but to attract insects.

Over millions of years, plants and insects have evolved intriguing relationships for the benefit of both partners, but sometimes to the detriment of one. The colours, patterns, scents and shapes of flowers tell the insect whether a particular plant is worth a visit, be it for nutritious pollen and nectar, as a cosy nesting site or simply because the flower looks like a mate or something else the insect finds attractive.

The plant, in turn, receives pollen carried by the insect on its legs or body and stripped off accidentally when the next flower is visited. That's how the plant world ensures there is a continuous exchange of genetic material between plants. Sophisticated structures in the flower or chemistry of the plant ensure that, in most cases, only pollen of the same species can fertilize another flower.

This process, termed insect pollination, ranges from very specialised adaptations – where only one species of insect pollinates a particular species of plant (as is the case for many rare orchids in the tropics) – to more general adaptations in which different types of insects visit one flower or one species of insect visits many different species of plants.

Everybody who has observed an open flower for even a little while will have noticed many different insects arriving and departing. Although there are plants which cater for almost all types of pollinators, most supply a particular group. The colour and design of a flower gives an indication at what type of pollinator is desired. Tubular flowers with a narrow opening, for example, can only be pollinated by insects with a long tongue-like structure, known as the proboscis, such as butterflies and moths possess.



FATAL ATTRACTION

Plant-insect interactions can be beneficial but are sometimes detrimental to plants, insects or Man.



*Above: The widespread desert shrub *Boscia foetida* was named after the carrion smell of its flowers, which attract flies for pollination.*

*Left: A member of the mint family, *Becium filamentosum* attracts insect pollinators with colourful petals, lines to show where the nectar is and a convenient landing platform for larger pollinators such as bees.*

Some insect pollinators are attracted by a foul rather than pleasant smell. Misled by the plant's colour and odour, flies try to lay their eggs in flowers of the succulent Hoodia and Stapelia, for example. Their larvae will not survive since there is no meat but only flower petals to feed upon. There are flowers which mimic insects so precisely that males of the copied species try to mate with the flower. The Australian Hammer orchid is a classic example of this very specialised pollination system.

Pollination is only one of the many facets of plant-insect interactions. More obvious is the fact that plants serve as the major food source for many insects. Whether being consumed in part, such as leaves, flowers, fruits and sap, or in their entirety depends on the type of insect feeding on them. This relationship is obviously one-sided since the plants do not benefit from it. Moreover, it might be detrimental to them.

Leaf and flower-eating insects range from caterpillars and the larvae of different insects to beetles, grasshoppers and stick insects. The mouth parts of many bugs, in turn, are adapted for piercing and sucking plant sap. Cicadas, aphids, scale insects and leaf or plant bugs are some examples. The latter are also economically important since they are pests of major crops such as cocoa, coffee, cotton and maize.

Feared by most people are larvae feeding on seeds, such as weevils and meal moths which not only deplete kitchen cupboards but large stores of economically important grains.

Although having a minor impact on insect populations, some plants "feed" in turn on insects. The Venus flytrap, for example, is a tropical plant which lures flies into its interior, then closes its "fangs" and digests the victims to get additional protein.

Whether beneficial or detrimental, plant-insect interactions are an important component of our environment. In many cases, when these interactions turn into problems, such as insect pests damaging

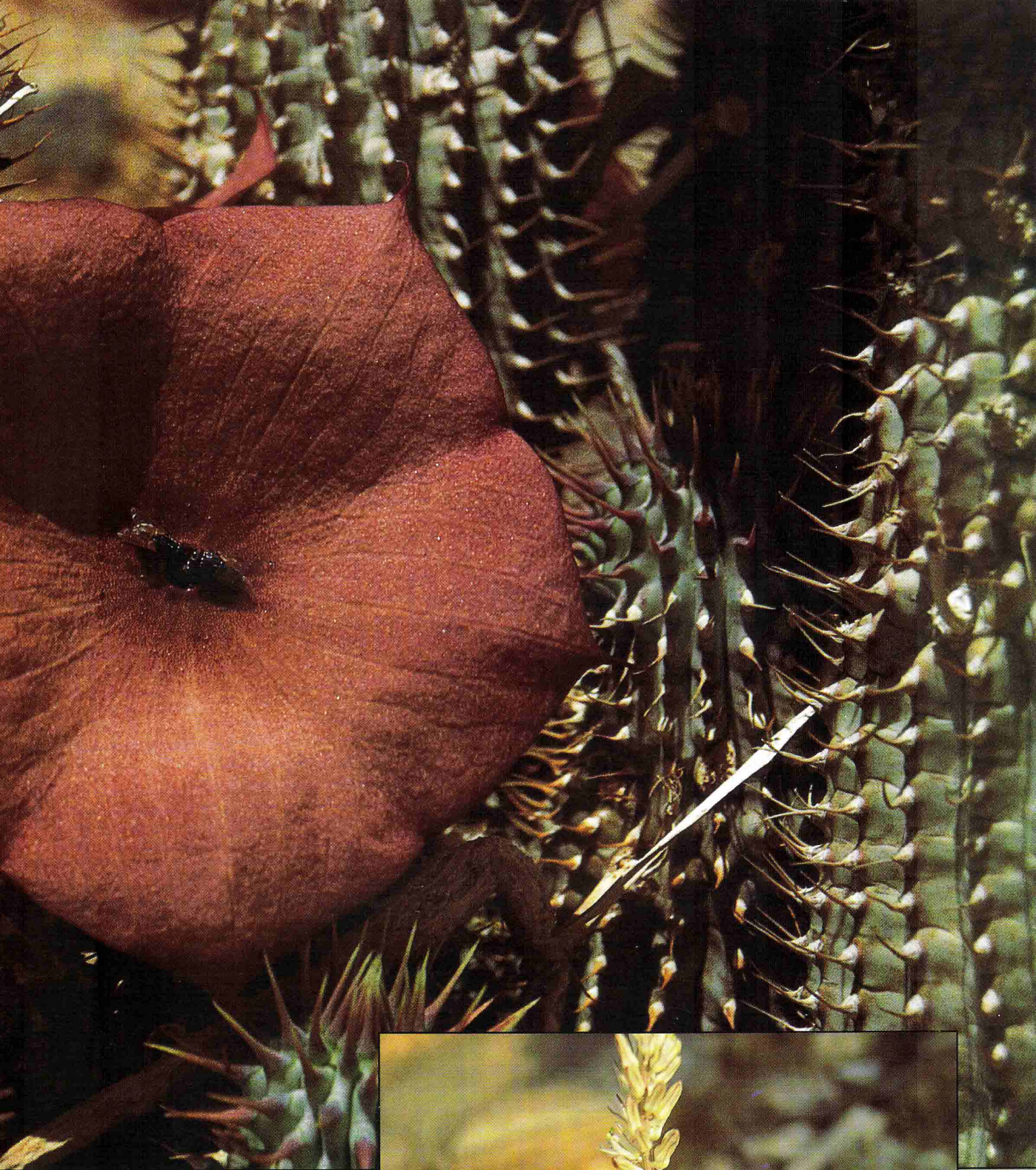


crops, it is because Man has interfered with the ecological balance, creating artificial environments which favour certain insects.

Large agricultural monocultures are a haven for insects that favour a particular type of plant. When no other plants harbouring enemies of these insects are present and food is abundant, they reproduce freely

and can destroy the harvest of an entire season. Large outbreaks of particular insects are not only a recent event related to modern agriculture. They have been mentioned in the Bible and occur under specific combinations of environmental conditions as part of the natural ecological balance.

Luckily, there are today many ways to deal with crop pests other



Above: Hoodia macrantha flowers, smelling of rotten meat, are designed to attract flies for pollination.

Right: Red bugs or fire bugs (Pyrrhocoridae) suck plant sap, preferably of flowers and fruits. They are pictured here on a lily flower.

than spraying large amounts of poison, which not only kills the pest insects but also the useful ones. Getting away from large monocultures to mixing crop



*Top: A colourful caterpillar enjoys its meal of lily leaf.
Above: A migratory butterfly (Belenois aurota) and Mason wasp (Delta caffer) visit flowers of the stem-succulent Cyphostemma bainesii.*

species is one natural way of controlling insect pests. To leave at least parts of natural vegetation in the surrounding areas of crop land provides habitats for natural enemies of crop pests and another

natural way of avoiding insect outbreaks.

We should remember that insects can be as beneficial as harmful, and therefore look carefully at what we consider an

unwanted creepy-crawly before crushing it.



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