Branches of the white milkwood *Sideroxylon inerme* free of caterpillar damage. Athough its leaves are tough and would appear unsuitable fodder for caterpillars, it is host to at least five species of moth, including one species of emperor moth. However, it is unusual to see branches totally defoliated.

Milkwood forests under attack by gypsy moths

by **Mike Picker,** Zoology Department, University of Cape Town, and **Rob Anderson,** Marine and Coastal Management, Department of Environmental Affairs and Tourism

In the autumn of 2005, in the quiet of day, the faint but determined chewing of a million small but effective mandibles could be heard, while a continuous rain of small droppings carpeted the ground beneath the white milkwood trees (*Sideroxylon inerme*) in the forests of Noordhoek in the Cape Peninsula. The white milkwood forests had been stripped bare by an outbreak of gypsy moth caterpillars.

Usually populations of this moth are low, and the caterpillars pass through their life cycle unnoticed. However, in certain 'outbreak years' the natural regulation of the gypsy moth is bypassed, and the caterpillars increase to such an extent that trees are stripped bare of all leaves. The species responsible for defoliating the milkwoods is *Eudasychira metathermes*. Caterpillars of this moth have been previously recorded on white milkwood as well as red milkwood *Mimusops obovata* trees, both members of the Sapotaceae family. However, there are no previous records of destructive outbreaks of this species.

The caterpillars are identified by their clusters of bristling, white, serrated hairs capable of causing mild to severe urticaria (welts on the skin). The adult moths of the family are equally distinctive. They are often active during the day and, typically, have broad cream, orange, brownish or translucent wings. In many cases there are considerable differences between the males and females, although both are fairly dull. In the most extreme cases of sexual dimorphism in the family, the female is reduced to a small fat wingless grub, which cannot even move from its pupal cocoon. When pupating, the caterpillar incorporates some of its spines into the protective cocoon. Even the moths sport the same kind of urticaria-

BELOW: A stand of white milkwood *Sideroxylon inerme* trees totally defoliated in the late summer of 2005 by an outbreak of the gypsy moth, *Eudasychira metathermes*. The defoliated tree is totally bereft of leaves, and the caterpillars have migrated to neighbouring trees to obtain sufficient food to complete their larval development.

LEFT: The nursery rhyme 'My mother said that I never should, play with the gypsies in the wood' was sound advice as these caterpillars of the white milkwood gypsy moth *Eudasychira metathermes* have a forward projecting pair of hair tufts from the head, one from the tail and four white tufts in the middle of the body, all with painful consequences to anyone that touches them. This arrangement of hair tufts is characteristic of caterpillars of the gypsy moth family (Lymantriidae) and responsible for the alternative family name of tussock moth. Its large head capsule is orange and its body has a characteristic white stripe running along the top from head to tail.

RIGHT: The male *Eudasychira metathermes* have feathery antennae, grey forewings and rusty-brown hindwings. The larger females have light cream forewings speckled in brown, and darker grey hindwings that have a black and cream edged border.

inducing hairs as the caterpillars have on their abdomen, and these are even incorporated into the egg mass. This protection probably explains why these moths are able to fly slowly during the day as few predators bother them.

The well-protected caterpillars feed continuously on each leaf, leaving only the midrib before moving on to the next one. In contrast, other palatable caterpillars, which are well camouflaged, take the trouble to sever the leaf on which they have been feeding even if they have just taken one bite of it so that the telltale caterpillar damage cannot alert insectivorous birds to their presence! In spite of the protective coat of barbed hairs of *E. metathermes*, the over-abundance of caterpillars attracted predators. One of us (Rob Anderson) watched Karoo prinias (tintinkies) carefully pick the pupae out of cocoons and eat them. The only bird that was seen eating adult caterpillars was a Diederick cuckoo (a caterpillar specialist, not deterred by caterpillar spines). Among insects, the common green mantid (*Sphodromantis gastrica*) was seen to eat them. However, this level of predation is very unlikely to have any impact on the populations of the moth.

The form of the white milkwood in Southern Africa (*Sideroxylon inerme*) occurs coastally from Saldanha Bay on the west coast eastwards into Mozambique. In South Africa the tree is protected, and large specimens have been proclaimed National Monuments. It is likely that the caterpillar *E. metathermes* occurs on white milkwood throughout most of its range (the moth has been recorded from KwaZulu-Natal). However, the authors are only aware of outbreaks at Noordhoek and Kleinmond in the Western Cape, a few hundred kilometres apart. Why should the white milkwood gypsy moth produce outbreaks only in certain years, and are there other species of moth that form outbreaks in Southern Africa? The gypsy moth family is one whose members typically form outbreaks, although other moth species from different families can do the same (e.g. the African army worm *Spodoptera exempta* is notorious for outbreaks on nearly all crops, although the species typically feeds on non-woody plants).

While little is known of the ecology of *E. metathermes*, a useful comparison can be made with a very destructive species of gypsy moth *Lymantria dispar* which is a major pest in North America where it was introduced more than a century ago from Europe and Asia. In its new country, it feeds on more than 100 species of woody plants (although it does have its favourites) and is notori-

ous for its outbreaks, which occur every few years. These typically last for a few successive years; during which total defoliation of forest trees combined with environmental stress factors (such as low winter rainfall) result in the death of approximately 20% (or higher) of forest trees. Populations eventually level out, probably as a result of the combined influence of environmental factors and insects that parasitize other insects. Extrapolating back to outbreaks of the white milkwood gypsy moth in South Africa, it is evident that repeated outbreaks on the same trees are likely, and that tree mortality might well result from such repeated outbreaks. However, at the time of writing (January 2006), very few caterpillars were present at the same Noordhoek site that had suffered massive defoliation the previous year. Most were nearly mature, suggesting that it is now too late in the season for a repeat outbreak.

While it is difficult to identify the reason for the drop in the number of caterpillars in 2006, natural enemies (parasitic insects) are probably involved. This is a clear case illustrating the importance of avoiding the use of pesticides to try and regulate insect populations on endemic plants, which would result in the destruction of a complex suite of predators and parasitoids (insects that parasitize other insects).

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Interestingly, although the milkwoods appear to have recovered, some still bear signs of the 2005 onslaught - many of the worst affected trees now have dead terminal branches, while others have produced a lot of new clusters of shortened leaves along their main stems, a growth form atypical of milkwoods and more associated with a fire response. There are numerous well-documented cases of long term responses by woody plants to a severe defoliation experience, attributed to factors ranging from nutrient stress to active defense responses of the plant against future defoliation.

BELOW: The flimsy cocoon of *Eudasychira metathermes* folded in a leaf incorporates the barbed hairs of the caterpillar. Moths emerge from the cocoons after about two weeks.

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Further reading

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