Short Communication

A lycaenid butterfly (*Anthene amarah* Guerin) selects unseasonal young *Acacia* shoots for oviposition

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Felling experiments on the indigenous thorn tree *Acacia tortilis* in the northern Transvaal revealed that *Anthene amarah* butterflies oviposit on unseasonal new coppice shoots. Felling resembles damage caused by large browsing mammals in that it modifies the normal phenological rhythms of trees, and in this way apparently extends the period during which high quality food is available to herbivorous insects such as *A. amarah*.

Gedurende afkap-proewe op die inheemse doringboom *Acacia tortilis* in die Noord-Transvaal het ek opgemerk dat *Anthene amarah*-skoenlappers hul eiers op buiteseisoenale nuwe lote gelê het. Afkap toon dieselfde effek as beskadiging deur groot struikvretende soogdiere wat die fenologiese ritme van bome verander en sodoende blykbaar die periode van hoë voedselkwaliteit vir plantvretende insekete soos *A. amarah* verleng.

Observations of *Anthene amarah* Guerin (Lycaenidae) caterpillars feeding on *Acacia tortilis* coppice shoots, support the hypothesis that disruption of normal plant phenology may benefit certain insect herbivores (Pullin 1987). The caterpillars of *A. amarah*, a common butterfly found throughout the range of *Acacia* in southern Africa, feed on young shoots of *Acacia* trees (Clark & Dickson 1971). *Acacia tortilis* and six other common *Acacia* species studied in the northern Transvaal, South Africa, grow in the warm, wet season, mainly between October and February (Milton 1987), and it is in this growing season that *A. amarah* is most abundant (Clark & Dickson 1971).

The *Acacia* species are important food plants for browsing mammals including elephant, rhinoceros, giraffe, antelope and domestic goats (Dunham 1980; Pellew 1980; Walker 1980). Some species such as *A. tortilis* may form a dense scrub when grazing mammals such as cattle remove grass cover in the absence of browsing mammals (Aucamp, Danckwerts & Venter 1984). In order to estimate the tolerance of *A. tortilis* to above-ground damage such as browsing, young *A. tortilis* trees, near Naboomspruit in the northern Transvaal were subjected to various defoliation, pruning and felling treatments and the regrowth cut and weighed (Milton 1988).

Observations made during the felling experiments indicate that *A. amarah* makes efficient use of unseasonal new shoot growth. On 15 February 1983, 18 *A. tortilis* trees, 1–2 m in height, were randomly selected from a population of some 300 similar sized trees on a 2 ha disused melon field, and were felled at ground level. Six weeks later, epicormic coppice shoots were removed from the tree stumps. Regrowth was cut again in April and May, in an attempt to exhaust the root systems of the felled trees. At each defoliation treatment, any insects on the new shoots were recorded and signs of mammal browsing were noted.

Anthene amarah eggs and caterpillars were present on 16 of 17 coppice shoots in March, 14 of 18 shoots in April and on 12 of 16 shoots in May. The butterflies had thus oviposited on 82% of the coppicing *A. tortilis* stumps within the matrix of undamaged conspecific trees. Monthly observations of 50 mature shoots on undamaged *A. tortilis* trees confirmed that *A. amarah* eggs and caterpillars were absent from older shoots between February and June 1983. Utilization of the coppice growth by mammals was considerably lower, since only 18% (9 of the 51) of the coppice shoots showed signs of browsing. Hares (*Lepus* sp.) were probably responsible.

Two ant species (*Pheidole* sp. and *Myrmecaria* sp.) which appeared to be feeding on honeydew secreted by the caterpillars occurred on 88% (37 out of 42) of the coppice shoots which harboured caterpillars. Ants were also observed feeding at extra-floral nectaries on four coppice shoots devoid of caterpillars. The two ant species coexisted on only two shoots, and *Pheidole* sp. was associated with *A. amarah* caterpillars three times more frequently than *Myrmecaria* sp. These ants presumably confer protection from predators in exchange for honeydew.

Although the mechanism whereby butterflies select their host plants is unclear, it seems to relate to the ways in which new shoots differ from mature shoots. The moisture content of coppice shoots averaged 73% compared with *ca* 40% in mature shoots on undamaged trees (Milton 1988). Secondary compounds, such as prussic acid, are present at high concentrations only in new shoots (Janzen, Doerner & Conn 1980), and it is possible that ovipositing female butterflies may be attracted to some of these chemicals. Alternatively the female butterflies might be responding to the high protein (Pellew 1980) and nitrogen concentrations (Webb & Moran 1978) in young *Acacia* shoots. Some insects have been shown to grow or reproduce faster when feeding on regrowth shoots (Webb & Moran 1978; Pullin 1987), and high nutrient concentration probably makes young shoots more suitable than mature shoots for the development of *A. amarah* larvae.

In contrast with *A. amarah* caterpillars, antelope browse mature *A. tortilis* shoots mainly in autumn and winter (Dunham 1980; Milton 1987). This is apparently because high concentrations of prussic acid (HCN) are present in the growing shoots of many *Acacia* species (Janzen *et al.* 1980; Bhadoria & Gupta 1981) including *A. tortilis*, and are toxic to ruminants (Watt & Breyer-Brandwijk 1962). The large numbers of myrmecine ants

associated with the caterpillars on young shoots may possibly further deter browsing mammals during spring and summer.

Unseasonal growth, resulting from damage to mature *Acacia* shoots, remains leafier and more succulent in winter than the older growth resulting from the spring growth flush (Milton 1987). It is therefore possible that plants damaged by mammals late in the growing season may be further debilitated by unseasonally high levels of insect activity. Disruption of the normal growing cycle by browsing mammals could provide a perennial food source for insects such as *A. amarah* which would otherwise be restricted seasonally in their utilization of plant hosts.

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