

QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES

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INSECTS ASSOCIATED WITH *EREMOPHILA GILESII*
F. MUELL. IN SOUTHERN QUEENSLAND

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SUMMARY

A diverse assemblage of insects, representing 7 orders, 23 families and 33 species, was found associated with *Eremophila gilesii* F. Muell. (green turkey bush) in southern Queensland. By far the most injurious of these were the wingless grasshoppers *Monistria pustulifera* (Walker) and *M. discrepans* (Walker). The stem-borers, *Xylorycta* sp., *Hypographia amictodes* Turner and *Chrysobothris australasiae* Hope, and the sandal-box hawk moth, *Coenotes eremophilae* (Lucas), exerted considerable control over the weed in localized areas. The role of these insects in naturally occurring biological control is discussed.

I. INTRODUCTION

Eremophila gilesii F. Muell. (green turkey bush) is a woody weed of grazing lands in south-western Queensland. Burrows (1971) estimated that up to 1.62 x 10⁶ ha have been rendered useless for grazing because of invasion by *E. gilesii*. The weed is increasing in density in areas where it occurs, both under light stocking and where stock are excluded. The genus *Eremophila* belongs to the Myoporaceae and includes about 120 species of shrubs and small trees endemic to Australia. According to Barlow (1971), *E. gilesii* comprises three subspecies, the Queensland subspecies having broader dentate leaves and being uniformly tetraploid.

Smith (1957) and Burrows (1971, 1973, 1974) reported that the wingless grasshopper, *Monistria pustulifera* (Walker), was common on *E. gilesii* and in some instances the effect of this insect on the plant was considered devastating. In addition, four other insects were reported by Brimblecombe (1955) attacking *E. gilesii*—a jewel beetle, *Chrysobothris* sp., a mealy bug, *Pseudococcus* sp., a brittle scale, *Asterolecanium* sp., and a "small wood moth" of the family Xyloryctidae. Burrows (1971) also noted that *Megachile capitonis* Cockerell was active around *E. gilesii* flowers and considered that it was likely to be the principal pollinating agent.

The current study was undertaken to characterize, in detail, the insect fauna of *E. gilesii*. This provides a firm base for future intensive studies on the biological control of this weed.

II. METHODS

Stands of *E. gilesii* were examined thoroughly for insects and insect damage during 14 trips to south-west Queensland at various time intervals from January 1973 to April 1975. At a number of sites through the natural range of the bush and at the Charleville and Toowoomba laboratories, immature and adult insects were hand-picked, swept or aspirated from the roots, stems, leaves and flowers of *E. gilesii*. Immature specimens were reared to adult forms on potted plants in the Toowoomba Laboratory. Feeding damage was recorded for each species.

III. RESULTS

A diverse assemblage of insects representing 7 orders, 23 families and 33 species was found associated with *E. gilesii* (table 1). Many of these host records are believed to be new or unpublished. In table 1, the terms "rare", "occasional" or "common" indicate that the species was encountered during the study only once, two or three times, or four or more times respectively.

TABLE 1
INSECTS ASSOCIATED WITH *Eremophila gilesii* IN SOUTHERN QUEENSLAND

Species	Frequency of Occurrence			Feeding Damage
	Rare	Occasional	Common	
Orthoptera				
Pyrgomorphidae				
<i>Monistria pustulifera</i> (Walker)			*	Severe damage to foliage, flowers and bark
<i>M. discrepans</i> (Walker)			*	
Acrididae				
<i>Austracris guttulosa</i> (Walker)		*		Some damage to foliage
Hemiptera				
Flatidae				
<i>Colgar</i> sp.	*			Negligible
Dictyopharidae				
<i>Gen. et sp. indet.</i>	*			Negligible
Cicadellidae				
<i>Gen. et sp. indet.</i>	*			Negligible
<i>Gen. et sp. indet.</i>		*		Negligible
Eriococcidae				
<i>Eriococcus</i> sp.	*			Negligible
<i>Gen. et sp. indet.</i>		*		Some damage, especially to new shoots
Austerolecaniidae				
<i>Austerolecanium</i> sp.		*		Some damage, especially to new shoots
Pseudococcidae				
<i>Planococcus citri</i> (Risso)		*		Some damage, especially to new shoots
<i>Rastococcus</i> sp.		*		Some damage, especially to new shoots
<i>Pseudococcus</i> sp.	*			Negligible
Aphididae				
<i>Aphis gossypii</i> Glover	*			Negligible
<i>Aphis</i> sp.	*			Negligible
Meridae				
<i>Gen. et sp. indet.</i>	*			Negligible
<i>Gen. et sp. indet.</i>		*		Some damage to new shoots
<i>Megacoelum dilutus</i> (Stal)	*			Negligible
Tingidae				
<i>Gen. et sp. indet.</i>		*		Some damage to new shoots

TABLE 1—continued

INSECTS ASSOCIATED WITH *Eremophila gilesii* IN SOUTHERN QUEENSLAND—continued

Species	Frequency of Occurrence			Feeding Damage
	Rare	Occasional	Common	
Lygaeidae				
<i>Germalus</i> sp.			*	Predacious
Pentatomidae				
<i>Poecilometis</i> sp.	*			Negligible
<i>Antestiopsis</i> sp.			*	Some damage to new shoots
Thysanoptera				
Thripidae				
<i>Pseudanaphothrips</i> <i>achaeus</i> (Bagnall)			*	Found only in flowers
Coleoptera				
Buprestidae				
<i>Chrysobothris</i> <i>australasiae</i> Hope		*		Tunnelling in stems
<i>Heospades chrysopygia</i>	*			Tunnelling in stems
Germain				
Diptera				
Cecidomyiidae				
<i>Gen. et sp. indet.</i>	*			Negligible
Lepidoptera				
Xyloryctidae				
<i>Xylorycta</i> sp.			*	Tunnelling in stems
Pyralidae				
<i>Hypographia amictodes</i> Turner		*		Tunnelling in stems
Sphingidae				
<i>Coenotes eremophilae</i> (Lucas)			*	Severe localized damage to foliage
Noctuidae				
<i>Heliothis punctigera</i>	*			Negligible damage to foliage
Wallengren				
Hymenoptera				
Megachilidae				
<i>Megachile capitonis</i> Cockerell			*	Nil—pollinator of flowers
Apidae				
<i>Apis mellifera</i> L.			*	Nil—pollinator of flowers
Formicidae				
<i>Iridomyrmex</i> sp.			*	Nil—associated with scale insects

IV. DISCUSSION

By far the most important insect species in the ecology of *E. gilesii* are the wingless grasshoppers *Monistria pustulifera* and *M. discrepans*. Both feed as nymphs and adults mainly on the foliage and small twigs, but will attack the flowers and green fruit. When the plant has been largely stripped of leaves the insect will chew the bark and ultimately ringbark and causes death of stems and twigs. Some idea of the effect on *E. gilesii* can be gauged from the report by Burrows (1973) that *M. pustulifera* killed more than 500 ha of dense bush within a 15 km radius of Charleville in 1970.

Although previous authors noted *M. pustulifera* feeding on *E. gilesii* they did not record *M. discrepans*. During the period of the present study *M. discrepans* far outnumbered *M. pustulifera*, at times in excess of 100:1. The decline in number of *M. pustulifera* from the numerous infestations in the 1969-70 and 1971-72 seasons, as reported by Burrows (1973), and the apparent increase in numbers of *M. discrepans*, are indicative of large, long-term fluctuations in the numbers of both species.

The stem-borers, *Xylorycta* sp., *Hypographia amictodes* Turner and *Chrysobothris australasiae* Hope, were also found causing considerable damage to the bush in restricted areas. On "Wallal", 17 km south of Charleville, up to 30% of the bushes were infested with either one or more of the three species. *H. amictodes* and *Xylorycta* sp. make short tunnels in the stems and feed on the bark, in most cases encircling the stem. The whole of the feeding area is covered with a woven sac-like cover containing faeces and scraps of bark. *C. australasiae* tunnels wholly within the stems, extending into the roots. Apart from the obvious damage caused by the three species, their tunnels also allow entry of fungi, termites and ants which cause further damage.

Coenotes eremophilae (Lucas), the sandal-box hawk moth, also common on *E. mitchellii* Benth. (Allsopp 1977), was the only other species to cause appreciable damage to *E. gilesii*. Up to 20 final instar larvae were found on scattered bushes on "Wallal" in March 1973. The larvae fed mainly on the leaves but also attacked the flowers and young twigs. The tachinids *Palexorista* sp. and *Exorista* sp. parasitized up to 70% of the larvae of *C. eremophilae* in some areas.

The bees *Apis mellifera* L. and *Megachile capitonis* Cockerell were found in large numbers flying around and entering the flowers of *E. gilesii*. Their role in the promotion of seed set, especially in the light of Burrows' (1971) findings that the flowers are largely self-incompatible, is probably very important.

The complex of scale insects found on *E. gilesii* caused only minor damage to the new shoots. Production of honey-dew, with resultant sooty mould and tending by ants, was observed in many cases.

Although, in some years, these insects exert appreciable control over small areas of *E. gilesii*, this is obviously not sufficient, as the weed is increasing in both area and density (Burrows 1971). The naturally occurring biological control of an indigenous weed can be enhanced by the introduction of suitable natural enemies of related plants from elsewhere or by the conservation of existing natural enemies. The latter approach would involve the use of measures to increase the effectiveness of insects such as *M. discrepans* and *M. pustulifera* by modification of their environment so as to increase their abundance as and when required. Such modification aimed to increase the effectiveness of the existing insects depends on an adequate study of the population ecology of both the insect and the host plant.

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