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# Insect herbivores associated with indigenous species of *Solanum* (Solanaceae) in the Transvaal, South Africa, and in Namibia

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Several indigenous *Solanum* (Solanaceae) species were surveyed in the Transvaal and Namibia as part of a broader study of the insect herbivores associated with indigenous, as well as weedy and cultivated exotic, solanums in southern Africa. Insects were collected on three *Solanum* species in the Transvaal and on 10 in Namibia. *Solanum panduriforme* E. Mey. and *S. incanum* L. were abundant in both regions, while *S. capense* L. was the most common species in Namibia. These three *Solanum* species supported an abundance of insect herbivores, which included many oligophages found on solanums in other regions of South Africa. Most of the *Solanum* insect species were found on a wide range of host plants, in a variety of habitats and under various climatic conditions. The extensive oligophagy among indigenous solanaceous insects has implications for introduced *Solanum* species and these are discussed. Although indigenous solanaceous insect species readily develop on the introduced crop *S. melongena* L. (eggplant), none attack the exotic weeds *S. elaeagnifolium* Cav. and *S. sisymbriifolium* Lam., except superficially. The taxonomic relationships between the introduced and indigenous *Solanum* species may account for these discrepancies. The surveys further emphasize the need to introduce natural enemies into South Africa for biological control of exotic *Solanum* weeds.

**Key words:** *Solanum incanum*, *Solanum panduriforme*, natural enemies, weed biocontrol.

## INTRODUCTION

The genus *Solanum* (Solanaceae) in southern Africa includes cultivated species, exotic weeds and many indigenous species (Wells *et al.* 1986; Gibbs Russell *et al.* 1987; Arnold & De Wet 1993). Surveys of the insect herbivores associated with indigenous, exotic and cultivated species of *Solanum* in South Africa commenced in 1985 in the eastern Cape and extended to KwaZulu-Natal (Olckers & Hulley 1989, 1991). The Transvaal and neighbouring country of Namibia have subsequently been surveyed and the results of these surveys are reported here.

The primary aim of our surveys was to collect the insects associated with indigenous *Solanum* species and to investigate whether some herbivores had extended their host ranges to introduced *Solanum* species. Although native insects can be detrimental on introduced crops, they may assist biological control of exotic weeds (*e.g.* Hokkanen & Pimentel 1984). The present collections focused on *Solanum* species in the subgenus *Leptostemonum* (Dun.) Bitt., as this group includes the exotic weeds *S. elaeagnifolium* Cav. and *S. sisymbriifolium* Lam. as

well as the introduced crop *S. melongena* L. (eggplant) (D'Arcy 1972).

In this paper we compare the Transvaal and Namibian *Solanum* faunas with those associated with indigenous species in the eastern Cape (Olckers & Hulley 1989) and KwaZulu-Natal (Olckers & Hulley 1991) and also with the exotic and cultivated *Solanum* species in the Transvaal (Hill *et al.* 1993; Olckers & Hulley 1994).

## MATERIALS AND METHODS

In the Transvaal, roadside surveys were carried out between 1987 and 1990. The localities and plant species that were sampled are listed in Table 1. The Namibian *Solanum* flora was sampled during a two-week roadside survey, along the main route between Ariamsvlei (28.07S 19.50E) and Tsumeb (19.12S 17.44E) (Table 2), in April 1991.

At each collection site, 10–20 plants were scanned for ectophagous herbivores in the field before representative parts of the plants were

**Table 1.** Localities in the Transvaal where three indigenous *Solanum* species were sampled.

Localities	Map reference	Plant species <sup>1</sup>
<b>Eastern Transvaal</b>		
Carolina	26.04S 30.06E	in
Kaapmuiden	25.32S 31.20E	in pa
Nelspruit	25.26S 30.50E	pa
Skukuza	24.25S 31.35E	pa
<b>Northern Transvaal</b>		
Giyani	23.19S 30.42E	in pa
Masalal	22.44S 30.48E	pa
Naboomspruit	24.29S 28.46E	in pa
Nylstroom	24.46S 28.30E	pa kw
Pienaar's River	25.13S 28.18E	in
Potgietersrus	24.16S 28.59E	pa
Thabazimbi	24.36S 27.24E	pa
Warmbad	24.52S 28.16E	in pa
<b>Western Transvaal</b>		
Coligny	26.16S 26.20E	in
Groot Marico		
Nature Reserve	25.31S 26.24E	in pa kw
Klerksdorp	26.52S 26.40E	in
Lichtenburg	26.02S 26.06E	in pa
Otshoop	25.48S 26.03E	pa
Pilanesberg National Park	25.15S 27.06E	in pa
Rustenburg	25.40S 27.15E	in pa
Ventersdorp	26.18S 26.48E	in
Zeerust	25.35S 26.03E	in pa

1. in = *S. incanum*, pa = *S. panduriforme*, kw = *S. kwebense*.

taken for further examination. Stems were dissected to expose endophagous species and the foliage was searched for 'cryptic' folivores. Fruit and flowers were kept in emergence cages to enable immature herbivores to complete their development and provide adult specimens.

Voucher specimens of unidentified insect species, referred to by their accession numbers (accession code AcRh), were deposited in the National Collection of Insects, Pretoria. Owing to the uncertain status of species within the genus *Solanum* in southern Africa, voucher specimens of the plants were lodged in the Selmar Schonland Herbarium (GRA), Albany Museum, Grahams-town.

## RESULTS

### Transvaal survey

#### Indigenous *Solanum* flora

Arnold & De Wet (1993) recorded 18 species in the subgenus *Leptostemonum* which are indige-

**Table 2.** Localities in Namibia where 10 indigenous *Solanum* species were sampled.

Localities	Map reference	Plant species <sup>1</sup>
<b>Southern region</b>		
Lutzputs	28.31S 20.37E	ca
Karasburg	27.45S 18.20E	ca
Asab	25.29S 17.57E	ca
Mariental	24.46S 17.57E	na
Mariental	24.27S 17.45E	na ri
(Hardap Dam)		
Rehoboth	23.19S 17.03E	ca ri
(Oanab Dam)		
South of		
Windhoek	22.44S 17.06E	ca cm
South of		
Windhoek	22.57S 17.10E	ri
<b>Northern region</b>		
Okahandja	22.20S 17.03E	ca in
Okahandja	21.34S 16.53E	ca co in na
Okahandja	21.27S 16.51E	ca pm
Okahandja	21.12S 16.50E	co in pm su
Otjiwarongo	20.16S 16.45E	pa
Otjiwarongo	20.22S 16.26E	in kw
Otavi	19.35S 17.29E	in pa
Grootfontein	19.34S 17.59E	pa
Tsumeb	19.16S 17.47E	in kw pa pm

1. ca = *S. capense*, co = *S. coccineum*, cm = *S. cf. coccineum*, in = *S. incanum*, kw = *S. kwebense*, na = *S. namaquense*, pa = *S. panduriforme*, pm = *S. cf. panduriforme*, ri = *S. rigescentoides* and su = *S. supinum*.

nous to the Transvaal (Table 3). According to herbarium records of the National Botanical Institute (NBI), only two species, *S. panduriforme* E. Mey. and *S. incanum* L., are abundant. We encountered three species during our roadside collections (Table 3). *Solanum panduriforme* and *S. incanum* were very common, while specimens of *S. kwebense* N.E. Br. were found twice. There is a possibility that other species in the Transvaal do not grow along roadsides, where our collections were concentrated.

#### Insect herbivores associated with *Solanum panduriforme*

Forty nine species of herbivorous insects were collected on *S. panduriforme* in the Transvaal (Table 4). Of these, at least 26 are specialist species that appear to attack only plants in the genus *Solanum*. The remaining insects include polyphagous species that also attack plants in other families (Annecke & Moran 1982; Swain & Prinsloo 1986), and species whose host ranges are unknown. The results of these and earlier surveys indicated that the solanaceous specialists are

**Table 3.** Occurrence<sup>1,2</sup> of indigenous species of *Solanum* in the Transvaal and Namibia, based on Arnold & De Wet (1993) and our own records.

<i>Solanum</i> species	Transvaal	Namibia	Other regions <sup>3</sup>
<i>S. acanthoideum</i> E. Mey.	+	-	CP N
<i>S. aculeastrum</i> Dun.	+	-	CP N S
<i>S. anguivi</i> Lam.	+	-	CP N S
<i>S. burchellii</i> Dun.	-	+	CP
<i>S. capense</i> L.	+	+ (13)	CP N OFS L
<i>S. catombelense</i> Peyr.	+	+	CP B
<i>S. coccineum</i> Jacq.	+	+ (2)	CP N OFS S B
<i>S. damarensis</i> Bitt.	-	+	
<i>S. delagoense</i> Dun.	+	+	B
<i>S. didymanthum</i> Dun.	+	-	N
<i>S. dinteri</i> Bitt.	-	+	
<i>S. giganteum</i> Jacq.	+	-	CP N S
<i>S. incanum</i> L.	+ (18)	+ (8)	CP N OFS L S B
<i>S. kwebense</i> N.E. Br.	+ (2)	+ (2)	B
<i>S. leucophaeum</i> Dun.	+	-	OFS
<i>S. linnaeanum</i> Hep. & Jaeg. (= <i>S. hermannii</i> Dun.)	+	-	CP N
<i>S. multiglandulosum</i> Bitt.	-	+	CP
<i>S. namaquense</i> Damm.	-	+ (4)	CP
<i>S. panduriforme</i> E. Mey.	+ (27)	+ (5)	CP N OFS L S B
<i>S. rigescens</i> Jacq.	+	+	CP N
<i>S. rigescentoides</i> Hutch.	-	+ (4)	
<i>S. rogersii</i> S. Moore	+	-	
<i>S. supinum</i> Dun.	+	+ (1)	CP OFS L B
<i>S. tomentosum</i> L.	+	-	CP N OFS L B

1. Denoted by + (presence) and - (absence) in the two regions.

2. The number of samples collected during our surveys is indicated in brackets.

3. Indicates presence in: CP = Cape Province, N = KwaZulu-Natal, OFS = Orange Free State, L = Lesotho, S = Swaziland, B = Botswana.

largely oligophagous and attack at least three *Solanum* species; only one monophagous species has been collected in South Africa (Table 4). In the present survey, herbivores varied greatly in abundance and only 16 species were common (occurring in at least 20 % of samples).

Of the 49 insect species associated with *S. panduriforme* in the Transvaal (Table 4), 28 were not collected on this species in KwaZulu-Natal (Olckers & Hulley 1991). However, of the 26 insect species associated with *S. panduriforme* in KwaZulu-Natal (Olckers & Hulley 1991), only eight did not occur on this species in the Transvaal. Insects which were unique to each of these two regions were, with few exceptions, all folivorous species. Although 28 more insect species were collected in the Transvaal than in KwaZulu-Natal, 24 of these were polyphagous or poorly known species which occurred in relatively few samples (Table 4). The more common oligophagous insect species were found on *S. panduriforme* in both the Transvaal and KwaZulu-Natal.

#### *Insect herbivores associated with Solanum incanum*

Of the 33 herbivorous species that were collected on *S. incanum* in the Transvaal (Table 4), 26 also attacked *S. panduriforme*. Twenty two of the species were oligophagous within the genus *Solanum* and there were no monophagous species.

Of the 33 herbivore species associated with *S. incanum* in the Transvaal (Table 4), 18 were not recorded on this species in KwaZulu-Natal (Olckers & Hulley 1991). However, of the 12 insect species associated with *S. incanum* in KwaZulu-Natal (Olckers & Hulley 1991), only four did not occur on this species in the Transvaal. The lower numbers of insect species recorded on *S. incanum* in KwaZulu-Natal may be attributed the fact that *S. incanum* was rare in KwaZulu-Natal.

#### *Geographic range of insect herbivores*

A total of 56 insect herbivore species were associated with *S. panduriforme* and *S. incanum* in the Transvaal, of which 46 % occurred nowhere else,

**Table 4.** Insect herbivores associated with *Solanum panduriforme* and *Solanum incanum* in the Transvaal. Species where specimens were found only once are excluded.

Species	Incidence <sup>1</sup>		Host range <sup>2,3</sup>
	<i>S. panduriforme</i>	<i>S. incanum</i>	
<b>FOLIAGE</b>			
<b>COLEOPTERA</b>			
<b>Buprestidae</b>			
<i>Pseudagrilus</i> sp. (AcRh 540)	33.3	5.5	Oligophagous (4) <sup>N</sup>
<b>Cerambycidae</b>			
<i>Oberea trigonalis</i> Breuning	22.2	27.8	Oligophagous (3) <sup>NB</sup>
<b>Chrysomelidae</b>			
<i>Chaetocnema</i> sp. (AcRh 465)	55.6	27.8	Oligophagous (11) <sup>N,EC,NB</sup>
<i>Conchyloctenia hybrida</i> (Boheman)	48.2	77.8	Oligophagous (7) <sup>N</sup>
<i>Conchyloctenia tigrina</i> Olivier	55.6	27.8	Oligophagous (7) <sup>N,EC,NB</sup>
<i>Decaria</i> sp. (AcRh 513)	18.5	5.5	Oligophagous (2) <sup>NB</sup>
<i>Lacoptera</i> sp. nr. <i>rugosicollis</i> Spaeth	3.7	—	Unknown
<i>Macrocoma</i> sp. (AcRh 544)	7.4	—	Unknown
<i>Podagraca maculata</i> Weise	3.7	—	Polyphagous
<b>Coccinellidae</b>			
<i>Epilachna hirta</i> (Thunberg)	22.2	16.7	Oligophagous (8) <sup>N,EC</sup>
<i>Epilachna lupina</i> Mulsant	3.7	—	Oligophagous (3) <sup>N</sup>
<i>Epilachna paykulli</i> Mulsant	3.7	—	Oligophagous (7) <sup>N</sup>
<b>Curculionidae</b>			
AcRh 627	3.7	—	Unknown
<i>Baris atrocoerulea</i> Boheman	—	5.5	Unknown
<i>Lipsanus</i> sp. (AcRh 514)	3.7	5.5	Oligophagous (2)
<i>Protostrophus ampicollis</i> (Fähræus)	3.7	—	Polyphagous
<i>Protostrophus fulvicolor</i> Van Schalkwyk	3.7	—	Unknown
<i>Protostrophus terrenus</i> Marshall	3.7	—	Unknown
<i>Protostrophus</i> sp. (AcRh 541)	14.8	—	Unknown
<i>Protostrophus</i> sp. (AcRh 536)	—	5.5	Unknown
<i>Protostrophus</i> sp. (AcRh 539)	7.4	—	Unknown
<i>Protostrophus</i> sp. (AcRh 500)	7.4	11.1	Oligophagous (2)
<i>Protostrophus</i> sp. (AcRh 524)	3.7	—	Unknown
<i>Protostrophus</i> sp. (AcRh 527)	11.1	—	Unknown
<i>Protostrophus</i> sp. (AcRh 623)	3.7	—	Unknown
<b>Elateridae</b>			
AcRh 542	—	5.5	Unknown
<b>DIPTERA</b>			
<b>Cecidomyiidae</b>			
AcRh 609	44.4	—	Monophagous <sup>N,NB</sup>
<b>HEMIPTERA</b>			
<b>Cicadellidae</b>			
AcRh 530	7.7	16.7	Oligophagous (4) <sup>N,NB</sup>
AcRh 648	48.2	27.8	Oligophagous (4) <sup>N,EC,NB</sup>
<b>Coreidae</b>			
<i>Acanthocoris</i> sp. (AcRh 563)	22.2	33.3	Oligophagous (2) <sup>N</sup>
<i>Anoplocnemis curvipes</i> Fabricius	7.4	16.7	Polyphagous
<i>Cletus</i> sp. (AcRh 556)	—	5.5	Unknown
<b>Dictyopharidae</b>			
<i>Aselgeia rumulifera</i> Walker	14.8	11.1	Oligophagous (3) <sup>N</sup>
<b>Lygaeidae</b>			
<i>Spilostethus</i> sp. (AcRh 559)	33.3	33.3	Polyphagous
<b>Membracidae</b>			
<i>Oxyrachis delalandei</i> Fairmaire	44.4	33.3	Oligophagous (8) <sup>N,EC,NB</sup>

Table 4 – continued

<b>Pentatomidae</b>					
<i>Carbula recurva</i> Distant	3.7	—	Unknown		N,NB
<i>Caura rufiventris</i> Germar	3.7	—	Unknown		
<i>Dryadocoris apicalis</i> (Herrich-Schaeffer)	3.7	—	Polyphagous		EC
<i>Halydioris pretoriae</i> Distant	—	5.5	Unknown		
<i>Nezara viridula</i> (Linnaeus)	7.4	5.5	Polyphagous		EC,NB
<b>Psyllidae</b>					
<i>Diaphorina solani</i> Capener	3.7	16.7	Oligophagous	(2)	
<b>Tingidae</b>					
<i>Urentius hystricellus</i> (Richter)	7.4	5.5	Oligophagous	(4)	EC,NB
<b>LEPIDOPTERA</b>					
<b>Gelechiidae</b>					
<i>Gnorimoschema operculella</i> (Zeller)	7.4	5.5	Polyphagous		
<i>Scrobipalpa incola</i> (Meyrick)	25.9	5.5	Oligophagous	(2)	
<b>Noctuidae</b>					
<i>Eublemma</i> sp. (AcRh 644)	37.0	50.0	Oligophagous	(8)	N,EC,NB
<i>Helicoverpa armigera</i> (Hübner)	11.1	5.5	Polyphagous		EC
<i>Pardasena</i> sp. nr. <i>diversipennis</i> Gaede	11.1	—	Oligophagous	(2)	N,EC
<b>Pyralidae</b>					
AcRh 512	7.4	—	Oligophagous	(4)	EC,NB
<b>FRUIT</b>					
<b>DIPTERA</b>					
<b>Lonchaeidae</b>					
<i>Lamprolonchaea smaragdi</i> (Walker)	—	12.5	Oligophagous	(2)	EC
<i>Silba ophyroides</i> (Bezzi)	20.0	—	Oligophagous	(3)	N,EC
<b>Muscidae</b>					
<i>Atherigona orientalis</i> Schiner	—	12.5	Oligophagous	(3)	N,EC
<b>LEPIDOPTERA</b>					
<b>Pyraustidae</b>					
<i>Daraba laisalis</i> (Walker)	80.0	50.0	Oligophagous	(8)	N,EC
<b>FLOWERS</b>					
<b>COLEOPTERA</b>					
<b>Anthicidae</b>					
<i>Notoxus cucullatus</i> La Ferté	4.8	—	Polyphagous		
<b>Nitidulidae</b>					
<i>Pria</i> sp. (AcRh 504)	52.4	16.7	Oligophagous	(7)	N,EC,NB
<b>LEPIDOPTERA</b>					
<b>Gelechiidae</b>					
<i>Scrobipalpa</i> sp. nr. <i>concreta</i> (Meyrick)	14.3	—	Oligophagous	(8)	N,EC
<b>THYSANOPTERA</b> (various)					
	19.1	18.3	Unknown		N,EC

1. Incidence is reflected as the percentage of samples in which the insects occurred.

2. Oligophagous insects attack only *Solanum* species; numbers in brackets signify the number of indigenous hosts. Polyphagous species also attack plants from families other than Solanaceae.

3. Occurs in: N = KwaZulu-Natal, EC = eastern Cape, NB = Namibia.

while 20 % also occurred in one, 23 % in two and 11 % in three other regions respectively (Table 4). However, the insect species localized in the Transvaal were mostly uncommon and a different pattern emerges if only common species are considered (*i.e.* those in at least 20 % of samples). Of the 16 common species, only three were

localized in the Transvaal, with three also occurring in one, four in two and six in three other regions respectively (Table 4). The extensive oligophagy among these common herbivores has enabled them to attack a wide range of *Solanum* species and thereby occur over a wide geographic range.

## Namibian survey

### Indigenous *Solanum* flora

Arnold & De Wet (1993) recorded 15 species in the subgenus *Leptostemonum* that are indigenous to Namibia. Of the 15 species, three do not occur in South Africa (Table 3). According to NBI herbarium records, only three species, *S. burchellii* Dun., *S. delagoense* Dun. and *S. kwebense*, are widespread. Ten indigenous species were collected during our survey (Tables 2, 3). Only four species were found in the arid region south of Windhoek (22.34S 17.06E), while nine were collected in the more vegetated northern region (Table 2).

The most frequently encountered species were *S. capense* L., *S. incanum* and *S. panduriforme*. The absence of a reportedly common species, *S. delagoense*, and the abundance of an apparently unrecorded species, *S. panduriforme*, (cf. NBI records) in our Namibian collections suggests that the two may be synonymous. This discrepancy is consistent with the confused taxonomy of the genus *Solanum* in southern Africa (Jaeger & Hepper 1986).

### Insect herbivores

Twenty six species of herbivorous insects were collected on the 10 *Solanum* species (Table 5). Only folivorous insects were found, although many fruits were also sampled. At least 17 of the species, as far as is known, feed only on plants in the genus *Solanum* (Table 6). Of the other nine insect species, six attack plants in families other than the Solanaceae (Annecke & Moran 1982; Swain & Prinsloo 1986), and three have host ranges that are not known. Of the species on *Solanum*, 16 were oligophagous and attacked a range of *Solanum* species (Tables 5, 6) and one species was monophagous. The relatively few insect species collected, compared with the Transvaal, may be explained by the effect of local abundance (*sensu* Strong *et al.* 1984), where uncommon species harbour poorer herbivore faunas than locally abundant species. The greater degree of patchiness of plants in Namibia and hence the fewer samples taken seem likely to have influenced the number of insect species collected.

The results of these and earlier surveys indicated that at least 17 of the insect herbivores in Namibia were previously recorded on the same or other indigenous species of *Solanum* in South Africa (Table 6). Fifty four percent of the Namibian fauna

was also recorded in the Transvaal, compared with 46 % in the eastern Cape and 38 % in KwaZulu-Natal (Table 6). Only nine of the Namibian species (35 %) were not collected elsewhere, although five of these are polyphagous and probably more widespread. The herbivores associated with the Namibian *Solanum* flora are largely typical of South African *Solanum* species.

## DISCUSSION

The surveys showed that insects occurring on *Solanum* in southern African are geographically widespread and occur on a wide range of host plants, in a variety of habitats and under various climatic conditions. These attributes greatly increase the possibility of the native herbivores being able to develop on introduced *Solanum* plants, including cultivated and weedy species.

Although only two indigenous *Solanum* insects have been recorded on cultivated potato (*S. tuberosum* L.) and none on tomato (*Lycopersicon esculentum* Mill.) (Annecke & Moran 1982), at least 17 species attack cultivations of eggplant (*S. melongena*) in South Africa (Olckers & Hulley 1994). This is because, unlike the other crops, *S. melongena* is closely related to a number of indigenous species, including *S. incanum* and *S. panduriforme*, which also fall under the Section *Melongena* Dun. in the subgenus *Leptostemonum* (D'Arcy 1972; Jaeger & Hepper 1986). Although *S. melongena* originated in tropical India (Khan 1979), there is evidence that it is a domesticated form of *S. incanum*, which is also widespread throughout the Old World tropics (Pearce & Lester 1979; Jaeger & Hepper 1986). The impact of indigenous solanaceous insects on eggplant has been overshadowed by cosmopolitan polyphagous pests which inflict considerable damage. As a result, eggplant cultivations are protected by intensive pesticide regimes which also control indigenous solanaceous insects (Olckers & Hulley 1994).

By contrast, neither of the exotic weeds *S. elaeagnifolium* and *S. sisymbriifolium* were attacked, except superficially (Hill *et al.* 1993). This situation can also be explained taxonomically. Although related at the subgeneric level, *S. elaeagnifolium* and *S. sisymbriifolium* belong to the Sections *Leprophora* Dun. and *Cryptocarpum* Dun. respectively, neither of which is represented by any of the South African *Solanum* species (D'Arcy 1972).

Indigenous *Solanum* herbivores may help to limit

**Table 5.** Insect herbivores associated with indigenous species of *Solanum* in Namibia. Species where specimens were found only once are excluded.

Species	Host plants in Namibia <sup>1</sup>									
	ca	co	cm	in	kw	na	pa	pm	ri	su
<b>COLEOPTERA</b>										
<b>Cerambycidae</b>										
<i>Oberea trigonalis</i> Breuning				x	x	x				
<b>Chrysomelidae</b>										
<i>Cassida litigiosa</i> Boheman							x			
<i>Conchyloctenia tigrina</i> Olivier			x	x						
<i>Decaria</i> sp. (AcRh 513)	x									
<i>Epitrix</i> sp. (AcRh 706) <sup>2</sup>			x	x	x	x	x			
<b>Nitidulidae</b>										
<i>Pria</i> sp. (AcRh 504)							x			
<b>DIPTERA</b>										
<b>Cecidomyiidae</b>										
AcRh 609							x			
<b>HEMIPTERA</b>										
<b>Cicadellidae</b>										
<i>Lamtoana</i> sp. (AcRh 703= AcRh 530)	x	x		x	x	x	x		x	
AcRh 648	x			x	x		x	x		
<b>Coreidae</b>										
<i>Acanthocoris spinosus</i> Signoret					x					
<i>Acanthocoris</i> sp. (AcRh 699)				x						
<b>Lygaeidae</b>										
<i>Spilostethus furculus</i> (Herrich-Schaeffer)	x			x		x			x	
<i>Spilostethus macilentus</i> Stål				x						
<b>Membracidae</b>										
<i>Oxyrachis delalandei</i> Fairmaire	x			x	x		x		x	
<b>Pentatomidae</b>										
<i>Antestiopsis orbitalis</i> Westwood					x	x				
<i>Carbula recurva</i> Distant	x	x			x	x	x			
<i>Nezara prunasis</i> Dallas								x		
<i>Nezara viridula</i> (Linnaeus)				x				x		
<i>Piezodorus purus</i> Stål				x		x	x		x	
<i>Veterna natalensis</i> Stål	x			x						x
<b>Tingidae</b>										
<i>Urentius hystricellus</i> (Richter)	x	x		x			x	x		
<b>LEPIDOPTERA</b>										
<b>Gelechiidae</b>										
AcRh 708	x	x		x		x	x	x	x	
<b>Noctuidae</b>										
<i>Crionica diversipennis</i> Gaede	x			x	x		x		x	x
<i>Eublemma</i> sp. (AcRh 644)	x	x		x	x	x	x	x	x	
<i>Selepa docilis</i> Butler	x	x		x	x	x	x	x	x	
<b>Pyralidae</b>										
AcRh 512	x				x	x	x	x	x	x
Number of herbivore species	13	6	2	17	12	11	15	8	10	2

1. Indicates presence on: ca = *S. capense*, co = *S. coccineum*, cm = *S. cf. coccineum*, in = *S. incanum*, kw = *S. kwebense*, na = *S. namaquense*, pa = *S. panduriforme*, pm = *S. cf. panduriforme*, ri = *S. rigescentoides*, su = *S. supinum*.

2. Also identified as *Chaetocnema* sp. (AcRh 465).



the distribution of species such as *S. panduriforme* and *S. incanum* which, although indigenous to South Africa, are listed as minor weeds of disturbed habitats (Wells *et al.* 1986). The inability of the insect herbivores to attack the exotic *Solanum* weeds further emphasizes the need to introduce natural enemies for biological control of these troublesome species in South Africa.

#### ACKNOWLEDGEMENTS

We thank J.H. Hoffmann (University of Cape Town), R.L. Kluge, M.W. Mansell (Plant Protection Research Institute) and anonymous referees for comments on the manuscript. The staff of the National Collection of Insects and M. Krüger (Transvaal Museum) are thanked for identification of insect specimens. We thank A.P. Dold, P.B. Phillipson (Rhodes University), E. Brink (Selmar Schonland Herbarium) and staff of the Windhoek National Herbarium for identification of plant specimens. The National Botanical Institute provided distribution records of indigenous *Solanum* species. We are grateful to the Officer in Charge of the Pilanesberg National Park for permitting collections in the reserve. A. Hulley provided assistance with catering and collection during the Namibian trip.

This work was funded by the Department of Agricultural Development and a Rhodes University Council Research Grant.

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**Table 6.** Host ranges and geographic distribution of insect herbivores associated with indigenous species of *Solanum* in Namibia.

Insect species	Host range <sup>1,2</sup>
<b>COLEOPTERA</b>	
<i>Cassida litigiosa</i>	Polyphagous
<i>Conchyloctenia tigrina</i>	Oligophagous (8) N,EC,T
<i>Decaria</i> sp.	Oligophagous (3) T
<i>Epitrix</i> sp.	Oligophagous (14) N,EC,T
<i>Oberea trigonalis</i>	Oligophagous (5) T
<i>Pria</i> sp.	Oligophagous (7) N,EC,T
<b>DIPTERA</b>	
Cecidomyiidae (AcRh 609)	Monophagous N,T
<b>HEMIPTERA</b>	
<i>Acanthocoris spinosus</i>	Oligophagous (4) N,EC
<i>Acanthocoris</i> sp.	Oligophagous (1)
<i>Antestiopsis orbitalis</i>	Polyphagous N,T
<i>Carbula recurva</i>	Unknown N,T
Cicadellidae (AcRh 648)	Oligophagous (7) N,EC,T
<i>Lamtoana</i> sp.	Oligophagous (8) N,T
<i>Nezara prunasis</i>	Unknown EC
<i>Nezara viridula</i>	Polyphagous EC,T
<i>Oxyrachis delalandei</i>	Oligophagous (11) N,EC,T
<i>Piezodorus purus</i>	Unknown EC
<i>Spilostethus furculus</i>	Polyphagous EC
<i>Spilostethus macilentus</i>	Polyphagous
<i>Veterna natalensis</i>	Polyphagous
<i>Urentius hystricellus</i>	Oligophagous (6) EC,T
<b>LEPIDOPTERA</b>	
<i>Criconica diversipennis</i>	Oligophagous (6)
<i>Eublemma</i> sp.	Oligophagous (14) N,EC,T
Gelechiidae (AcRh 708)	Oligophagous (7)
Pyrilidae (AcRh 512)	Oligophagous (9) EC,T
<i>Selepa docilis</i>	Oligophagous (8)

1. Oligophagous insects attack only *Solanum* species; numbers in brackets signify the number of indigenous hosts (Namibian and South African) on which collected. Polyphagous species also attack plants from families other than Solanaceae.

2. Occurs in: N = KwaZulu-Natal, EC = eastern Cape, T = Transvaal.

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Accepted 1 December 1994