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Systematic revision of *Thaumastocoris* Kirkaldy (Hemiptera: Heteroptera: Thaumastocoridae)

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Abstract

The genus *Thaumastocoris* is revised. Nine new species are described (*T. busso*, *T. freomooreae*, *T. kalaako*, *T. majeri*, *T. nadeli*, *T. ohallorani*, *T. roy*, *T. safordi*, and *T. slateri)* and the five previously described species are redescribed. A diagnostic key to species is provided, supported with illustrations of key character systems and maps depicting their distributional range. Host plants are tabulated, and biology and host plant associations are discussed.

Key words: taxonomy, key to species, new species, host, biology, distribution, invasive species

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Introduction

Kirkaldy (1908) first erected *Thaumastocoris* as a monotypic genus for the new species *Thaumastocoris australicus* Kirkaldy, based on a single carded specimen from Bundaberg, Queensland. He erected the subfamily Thaumastocorinae to accommodate its systematic placement within the family Lygaeidae Schilling. Subsequently, Reuter (1912) elevated this subfamily to family status on the basis of its unique morphology.

The monograph of Drake and Slater (1957) documented the taxonomic history of Thaumastocoridae, described many new taxa, and discussed their phylogeny and infrafamilial relationships. They designated a neotype for the lost holotype of *T. australicus* and described two new species (*T. hackeri* and *T. petilus*). Rose (1965) reviewed the species status of a number of Australian Thaumastocorinae and described an additional new species, *T. macqueeni*. Cassis and Gross (1995) catalogued the Australian Thaumastocoridae and reviewed aspects of their biology and host plant associations. Cassis *et al*. (1999) reviewed the taxonomy of most described Thaumastocorinae, provided many new host plant records, and extended our understanding of many species. There have been no subsequent papers of any significance on the taxonomy of Australian Thaumastocoridae based on material collected in Australia.

In 2001 dramatic infestation of Sydney's eucalypts by an undescribed species of *Thaumastocoris* brought to light this little known group of cimicomorphan bugs (Figure 1A). Cassis *et al*. (1999) highlighted the need for a taxonomic revision of *Thaumastocoris*, indicating that the material they identified as *T. australicus* probably represented more than one species.

Carpintero and Dellapé (2006) described the above mentioned new species of *Thaumastocoris*, as *T. peregrinus* Carpintero and Dellapé, from alien populations accidentally introduced to Argentina, at the same time recognising its Australian origins. This species was putatively identified as *T. australicus* in the material examined by Cassis *et al.* (1999). Concurrent with the infestation of *T. peregrinus* in Sydney, an undescribed species of *Thaumastocoris* was discovered on urban eucalypts. This insect, here described as *T. safordi* n.sp., has since become a pest on *Corymbia* spp. in Sydney, and specifically *C. variegata* in northern New South Wales and southern Queensland (Figure 1B).

Over the past ten years Cassis, Schuh and their co-workers (Cassis *et al*. 2007) have undertaken a systematic collection of true bugs in Australia, which are mostly housed at the Australian Museum, Sydney. Examination of these materials in this work revealed numerous new species of *Thaumastocoris.*

The purpose of this work is to address this taxonomic impediment and provide the first modern systematic revision of *Thaumastocoris* since Drake and Slater (1957). This will serve as an important identification resource for this economically important group, which has a major and ever-expanding impact on hardwood eucalypt plantations and urban forests in Australia (Noack and Rose 2007) and overseas, where it is becoming a significant forestry pest (Wingfield *et al*. 2008).

Material and methods

Measurements of all *Thaumastocoris* species are given in Table 2. Where possible at least 10 specimens of each sex were measured and these individuals came from various populations. All measurements are given in millimetres.

The pygophore and paramere are illustrated in ventral view with the paramere *in situ* (an additional dorsal view is provided for more complex species) for all but two species; *T. macqueeni* is only known from the holotype male and only female specimens of *T. kalaako* n.sp. are known.

Habitus photographs of the male holotype (except female holotype *T. kalaako* n.sp.) and paratype female are given. Scanning electron micrographs of key characters are given for most species.

Acronyms for the institutions and collections from which specimens came are as follows:

ANIC	Australian National Insect Collection, CSIRO, Canberra;
AM	Australian Museum, Sydney;
MLP	Museo de Ciencias Naturales de La Plata, Buenos Aires, Argentina;
MMPC	Melinda Moir Private Collection;

MV	Museum Victoria, Melbourne;
NAPC	Nigel Andrew Private Collection;
QM	Queensland Museum, Brisbane;
SAMA	South Australian Museum, Adelaide;
UNSW	University of New South Wales, Sydney;
WAAD	Western Australian Agriculture Department, Perth;
WAM	Western Australian Museum, Perth; and,
USNM	United States National Museum, Washington.

Locality records are listed alphabetically by state, and then by locality.

Homology and terminology. Morphological homologies and terminology chiefly follow Drake and Slater (1957) and Cassis *et al.* (1999), with the following modifications.

Mandibular plates. These head sclerites are diagnostic in the delineation of genera of Thaumastocorinae (Table 1). Whereas the dorsal surface of the mandibular plates (= juga of Drake and Slater 1957) are convex in *Baclozygum* Bergroth, *Onymocoris* Drake and Slater and *Wechina* Drake and Slater, all *Thaumastocoris* species have flat to strongly excavated mandibular plates which are also most often anterolaterally flared. The mandibular plates of *Thaumastocoris* extend past the clypeus (= tylus of Drake and Slater 1957) often by more than the length of the clypeus itself.

TABLE 1. Comparison of diagnostic characters for genera of Thaumastocorinae.

Character	*Baclozygum*	*Onymocoris*	*Thaumastocoris*	*Wechina*
Body shape	Elongate and strongly dorsoventrally compressed	Elongate to ovoid and weakly dorsoventrally compressed	Elongate and strongly dorsoventrally compressed	Elongate and dorsoventrally compressed
Pronotal constriction	Weak to strong	weak	Weak to strong	Moderate
Mandibular plate length cf. clypeus	Longer by ½ to ¾ clypeal length	Equal with to just extending past clypeus	longer by clypeal length or more	Slightly longer than clypeal length
Mandibular plates	Convex	Convex	Flat to strongly concave	Convex
Mandibular plate contiguous	Variable	No	Yes	Yes
Labium length	Moderate to long	Long	Short to moderate	Long
Femora incrassate	Weak to strongly	No to weakly	Strongly	Weakly
Eyes pedicellate	Weak to moderately	Moderately	Weak to strongly	Strongly
Antennal thickness	fine	fine	sturdy	Fine
Bucculae with explanate posterior margin	No	No	No to explanate	?
Tibial teeth number	Non-conspicuous, fine <6	Conspicuous, moderately thick; <4	Conspicuous, thick; 3 to <20	?
Dorsum with long vestiture	Moderate to thick	Thick	No to moderately	No

Fossula spongiosa. These leg structures consist of an area covered with slender short hairlike structures ventrally on the apex of the tibia. These are termed tenent hairs and are not setae but acanthae because of the absence of a socket (Weirauch 2007). Fossula spongiosa (= tibial appendix of Cassis *et al.* 1999; = lobate sensory appendage of Drake & Slater 1957) are present on the tibial apex of Thaumastocorinae but absent on the other two Thaumastocoridae subfamilies, Xylastodorinae Barber and Thaicorinae Kormilev. This character, along with the presence or absence of parameres and pulvilli, are used primarily to distinguish the three subfamilies (Slater & Brailovsky 1983; Heiss & Popov 2002). Although the relative length of the fossula spongiosa compared to the second tarsi are estimated in species descriptions, the use of this character is problematic as they are often buckled and bent as an artefact of preservation and therefore difficult to evaluate. This is particularly so with pinned specimens.

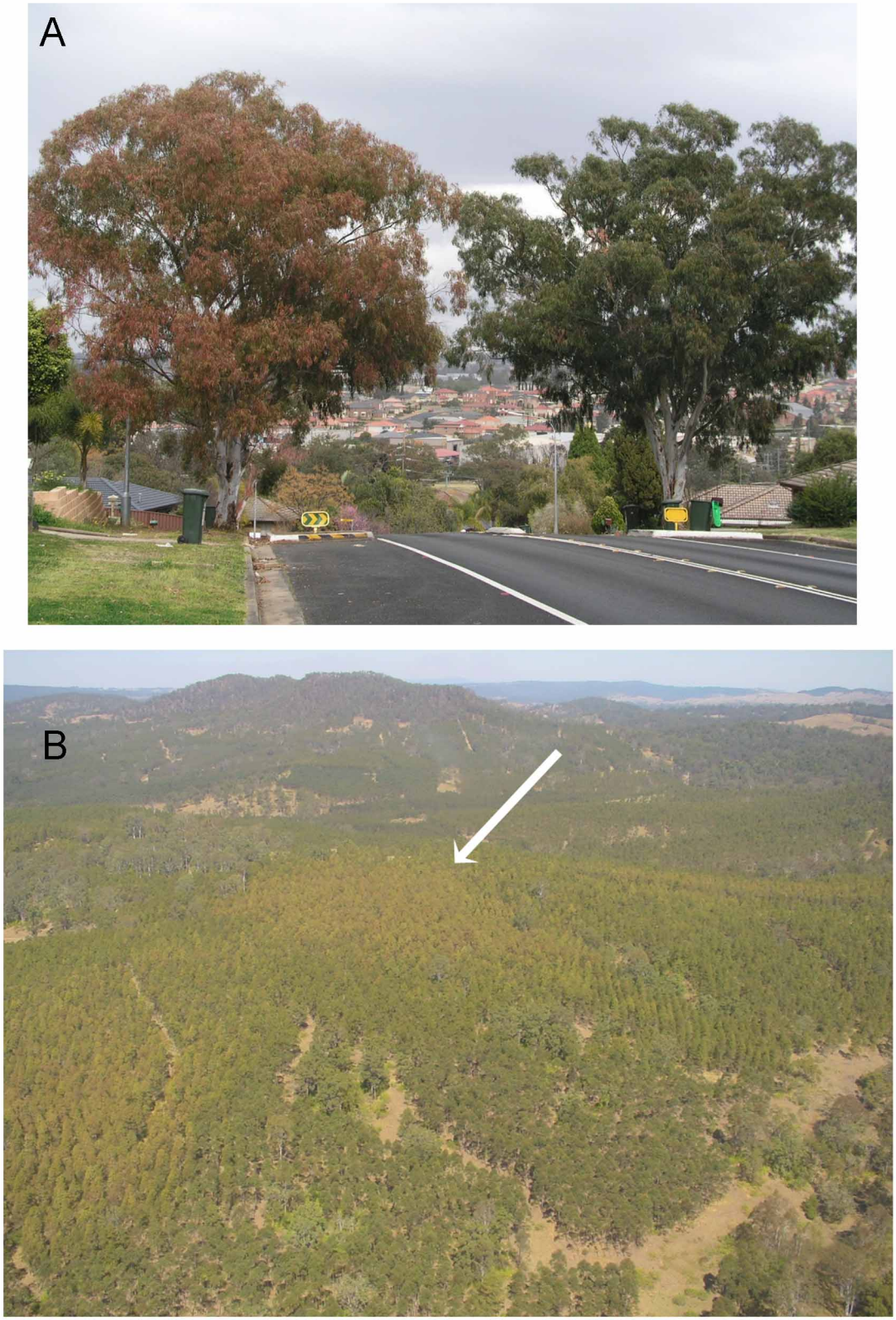

FIGURE 1. A. *Thaumastocoris peregrinus* damage on *Eucalyptus scoparia*, Sydney, Australia. (photo J Kaapro) **B.** *Thaumastocoris safordi* damage of *Corymbia variegata* plantation, 30 km southwest Casino, NSW, Australia. (photo A Carnegie).

FIGURE 2. A. *Thaumastocoris petilus* on *Melaleuca glomerata*, Palm Valley, Finke Gorge National Park, NT, Australia. (photo C Symonds) **B.** *Thaumastocoris freomooreae* mallee habitat, Murray Sunset National Park, Vic, Australia. (photo A Noack) .

TABLE 2. Measurements of *Thaumastocoris* species

Species		Length							Width									
		Mandib plate	Head	Callo-site region	Disc	Labium	Body	Wing	Mandib plate	Head outer eye	Inter ocul	Callo-site region	Disc	abdom	AI	AII	AIII	AIV
australicus																		
male	**Mean**	**0.28**	**0.54**	**0.20**	**0.22**	**0.25**	**2.64**	**1.67**	**0.35**	**0.70**	**0.45**	**0.59**	**0.69**	**0.92**	**0.17**	**0.31**	**0.33**	**0.28**
	SD	0.02	0.02	0.01	0.01	0.01	0.07	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.01	0.01	0.01	0.02
	Range	0.07	0.05	0.04	0.02	0.04	0.24	0.08	0.05	0.07	0.05	0.07	0.07	0.12	0.03	0.03	0.04	0.04
	Min	0.25	0.52	0.18	0.21	0.23	2.53	1.64	0.33	0.67	0.43	0.57	0.67	0.86	0.16	0.30	0.31	0.26
	Max	0.32	0.57	0.22	0.23	0.27	2.77	1.72	0.38	0.74	0.48	0.64	0.74	0.98	0.19	0.33	0.35	0.30
	Count	10	10	10	10	9	8	9	10	10	10	10	10	8	10	9	8	8
female	**Mean**	**0.28**	**0.54**	**0.21**	**0.23**	**0.26**	**2.83**	**1.84**	**0.34**	**0.72**	**0.46**	**0.62**	**0.74**	**1.04**	**0.18**	**0.33**	**0.33**	**0.30**
	SD	0.01	0.01	0.01	0.01	0.01	0.11	0.09	0.01	0.02	0.01	0.02	0.02	0.07	0.01	0.02	0.02	0.02
	Range	0.01	0.03	0.04	0.03	0.02	0.31	0.20	0.04	0.04	0.03	0.05	0.06	0.20	0.03	0.06	0.06	0.04
	Min	0.28	0.52	0.19	0.22	0.25	2.61	1.72	0.33	0.70	0.45	0.59	0.70	0.91	0.16	0.30	0.30	0.28
	Max	0.29	0.55	0.23	0.25	0.27	2.92	1.92	0.37	0.74	0.48	0.64	0.76	1.11	0.19	0.36	0.36	0.32
	Count	7	7	7	7	6	7	6	7	7	7	7	7	7	7	7	5	5
busso																		
male	**Mean**	**0.31**	**0.56**	**0.23**	**0.24**	**0.32**	**2.84**	**1.81**	**0.34**	**0.74**	**0.47**	**0.64**	**0.76**	**1.05**	**0.20**	**0.45**	**0.35**	**0.32**
	SD	0.01	0.02	0.01	0.00	0.04	0.34	0.10	0.01	0.02	0.02	0.01	0.02	0.00	0.00	0.02	0.01	0.01
	Range	0.02	0.03	0.01	0.00	0.06	0.47	0.14	0.02	0.02	0.04	0.03	0.04	0.00	0.01	0.03	0.01	0.02
	Min	0.30	0.55	0.23	0.24	0.28	2.61	1.74	0.33	0.74	0.45	0.63	0.74	1.05	0.20	0.43	0.34	0.31
	Max	0.32	0.58	0.24	0.24	0.34	3.08	1.88	0.35	0.76	0.49	0.66	0.78	1.05	0.20	0.46	0.35	0.33
	Count	3	3	3	3	3	2	2	3	3	3	3	3	2	3	3	3	3
female	**Mean**	**0.32**	**0.55**	**0.23**	**0.23**	**0.33**	**2.96**	**1.77**	**0.33**	**0.75**	**0.49**	**0.65**	**0.76**	**1.02**	**0.19**	**0.42**	**0.36**	**0.32**
	SD	0.01	0.00	0.00	0.01	0.01	0.00	0.05	0.00	0.03	0.01	0.03	0.03	0.05	0.01	0.03	0.02	0.01
	Range	0.01	0.01	0.00	0.01	0.01	0.00	0.08	0.00	0.04	0.01	0.05	0.06	0.10	0.02	0.06	0.04	0.01
	Min	0.32	0.54	0.23	0.23	0.33	2.96	1.72	0.33	0.74	0.48	0.63	0.74	0.96	0.18	0.40	0.34	0.32

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TABLE 2. (continued)

Species		Length							Width									
		Mandib plate	Head	Callo-site region	Disc	Labium	Body	Wing	Mandib plate	Head outer eye	Inter ocul	Callo-site region	Disc	abdom	AI	AII	AIII	AIV
	Max	0.33	0.55	0.23	0.24	0.34	2.96	1.80	0.33	0.78	0.49	0.68	0.80	1.06	0.20	0.46	0.38	0.33
	Count	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3
freomooreae																		
male	**Mean**	**0.28**	**0.55**	**0.21**	**0.21**	**0.40**	**2.74**	**1.67**	**0.34**	**0.72**	**0.45**	**0.60**	**0.70**	**0.86**	**0.18**	**0.40**	**0.36**	**0.33**
	SD	0.03	0.03	0.02	0.02	0.03	0.19	0.12	0.03	0.03	0.02	0.04	0.03	0.10	0.01	0.03	0.02	0.03
	Range	0.09	0.11	0.07	0.05	0.07	0.55	0.42	0.08	0.11	0.07	0.13	0.10	0.31	0.05	0.09	0.07	0.09
	Min	0.24	0.49	0.18	0.18	0.37	2.45	1.40	0.30	0.64	0.40	0.51	0.64	0.62	0.15	0.35	0.33	0.28
	Max	0.33	0.60	0.25	0.23	0.44	3.00	1.82	0.38	0.75	0.47	0.64	0.74	0.93	0.20	0.44	0.40	0.37
	Count	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	8
female	**Mean**	**0.31**	**0.60**	**0.21**	**0.22**	**0.43**	**3.00**	**1.74**	**0.37**	**0.77**	**0.48**	**0.63**	**0.74**	**1.11**	**0.18**	**0.42**	**0.39**	**0.34**
	SD	0.03	0.02	0.02	0.02	0.01	0.14	0.06	0.04	0.04	0.01	0.02	0.02	0.07	0.01	0.01	0.02	0.03
	Range	0.07	0.05	0.05	0.06	0.04	0.35	0.18	0.10	0.13	0.04	0.06	0.07	0.16	0.03	0.04	0.07	0.08
	Min	0.26	0.57	0.18	0.19	0.41	2.77	1.66	0.30	0.74	0.46	0.59	0.71	1.01	0.17	0.40	0.35	0.30
	Max	0.33	0.62	0.23	0.25	0.45	3.12	1.84	0.40	0.87	0.50	0.65	0.78	1.17	0.20	0.44	0.42	0.38
	Count	10	10	10	10	9	10	10	10	10	10	10	10	10	10	9	9	9
hackeri																		
male	**Mean**	**0.27**	**0.56**	**0.22**	**0.24**	**0.57**	**3.11**	**2.04**	**0.28**	**0.84**	**0.50**	**0.61**	**0.79**	**1.11**	**0.20**	**0.49**	**0.45**	**0.36**
	SD	0.01	0.02	0.03	0.02	0.02	0.13	0.06	0.02	0.02	0.02	0.03	0.03	0.08	0.02	0.03	0.02	0.01
	Range	0.03	0.06	0.07	0.04	0.07	0.28	0.16	0.05	0.06	0.04	0.08	0.09	0.25	0.05	0.7	0.04	0.03
	Min	0.25	0.52	0.18	0.22	0.53	2.96	1.96	0.25	0.80	0.48	0.59	0.74	0.98	0.18	0.45	0.43	0.35
	Max	0.28	0.58	0.25	0.26	0.60	3.24	2.12	0.30	0.86	0.52	0.67	0.83	1.23	0.23	0.52	0.47	0.38
	Count	8	8	8	7	7	7	6	8	8	8	8	8	7	8	8	5	5
female	**Mean**	**0.27**	**0.53**	**0.18**	**0.23**	**0.55**	**3.29**	**2.17**	**0.29**	**0.83**	**0.51**	**0.62**	**0.82**	**1.28**	**0.19**	**0.49**	**0.43**	**0.35**
	SD	0.02	0.07	0.01	0.00	0.04	0.06	0.18	0.01	0.02	0.02	0.03	0.04	0.06	0.01	0.01		

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TABLE 2. (continued)

Species		Length							Width									
		Mandib plate	Head	Callo-site region	Disc	Labium	Body	Wing	Mandib plate	Head outer eye	Inter ocul	Callo-site region	Disc	abdom	AI	AII	AIII	AIV
	Range	0.04	0.14	0.02	0.00	0.05	0.12	0.24	0.02	0.04	0.04	0.05	0.07	0.12	0.02	0.02		
	Min	0.25	0.45	0.18	0.23	0.53	3.24	2.04	0.28	0.81	0.49	0.59	0.78	1.23	0.18	0.48		
	Max	0.29	0.49	0.20	0.23	0.58	3.36	2.30	0.30	0.85	0.53	0.64	0.85	1.35	0.20	0.50		
	Count	3	3	3	3	2	3	2	3	3		3	3	3	3	3	1	1
kalaako																		
male			**Unknown**								**Unknown**							
female	**Mean**	**0.26**	**0.46**	**0.20**	**0.15**	**0.43**	**2.33**	**1.34**	**0.31**	**0.66**	**0.43**	**0.56**	**0.64**	**0.88**	**0.15**	**0.31**	**0.29**	**0.28**
	SD	0.02	0.00	0.00	0.00	0.01	0.04	0.03	0.01	0.01	0.01	0.00	0.01	0.03	0.01	0.00	0.01	0.01
	Range	0.03	0.00	0.01	0.01	0.02	0.08	0.06	0.02	0.01	0.01	0.00	0.01	0.05	0.01	0.01	0.02	0.01
	Min	0.25	0.46	0.20	0.15	0.43	2.29	1.30	0.30	0.66	0.42	0.56	0.64	0.86	0.14	0.31	0.28	0.28
	Max	0.28	0.46	0.21	0.16	0.45	2.37	1.36	0.32	0.67	0.43	0.56	0.65	0.91	0.15	0.32	0.30	0.29
	Count	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
macqueeni																		
male	**Mean**	**0.31**	**0.57**	**0.26**	**0.23**	**0.50**	**2.92**	**1.82**	**0.31**	**0.80**	**0.53**	**0.68**	**0.84**	**1.19**	**0.14**	**0.30**	**0.37**	**0.40**
	Count	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
female			**Unknown**								**Unknown**							
majeri																		
male	**Mean**	**0.27**	**0.51**	**0.20**	**0.21**	**0.32**	**2.60**	**1.69**	**0.31**	**0.70**	**0.44**	**0.59**	**0.71**	**0.88**	**0.17**	**0.35**	**0.33**	**0.33**
	SD	0.01	0.01	0.01	0.01	0.01	0.07	0.02	0.01	0.02	0.01	0.01	0.01	0.03	0.01	0.01	0.02	0.01
	Range	0.02	0.02	0.03	0.03	0.02	0.20	0.06	0.02	0.04	0.01	0.03	0.04	0.07	0.02	0.03	0.04	0.04
	Min	0.26	0.50	0.19	0.20	0.32	2.53	1.66	0.31	0.69	0.44	0.58	0.70	0.84	0.16	0.34	0.31	0.30
	Max	0.28	0.52	0.22	0.23	0.34	2.73	1.72	0.33	0.73	0.45	0.61	0.74	0.91	0.18	0.37	0.35	0.34
	Count	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	7
female	**Mean**	**0.28**	**0.53**	**0.21**	**0.21**	**0.34**	**2.74**	**1.68**	**0.33**	**0.72**	**0.46**	**0.62**	**0.73**	**0.99**	**0.17**	**0.35**	**0.33**	**0.32**

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TABLE 2. (continued)

Species		Length							Width									
		Mandib plate	Head	Callo-site region	Disc	Labium	Body	Wing	Mandib plate	Head outer eye	Inter ocul	Callo-site region	Disc	abdom	AI	AII	AIII	AIV
	SD	0.01	0.01	0.01	0.01	0.01	0.07	0.03	0.01	0.01	0.01	0.02	0.01	0.07	0.01	0.02	0.00	0.00
	Range	0.01	0.03	0.03	0.02	0.04	0.19	0.06	0.01	0.02	0.03	0.04	0.03	0.16	0.03	0.04	0.01	0.01
	Min	0.28	0.51	0.20	0.20	0.32	2.65	1.66	0.33	0.71	0.45	0.59	0.71	0.91	0.15	0.33	0.33	0.32
	Max	0.29	0.54	0.23	0.22	0.36	2.84	1.72	0.34	0.73	0.48	0.63	0.74	1.07	0.18	0.37	0.34	0.33
	Count	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
nadeli																		
male	**Mean**	**0.30**	**0.52**	**0.20**	**0.21**	**0.31**	**2.71**	**1.59**	**0.32**	**0.67**	**0.42**	**0.58**	**0.67**	**0.87**	**0.15**	**0.34**	**0.31**	**0.28**
	SD	0.02	0.03	0.02	0.01	0.02	0.16	0.08	0.02	0.02	0.02	0.03	0.02	0.06	0.01	0.02	0.01	0.01
	Range	0.06	0.09	0.06	0.03	0.05	0.51	0.30	0.05	0.07	0.06	0.10	0.06	0.18	0.01	0.07	0.04	0.02
	Min	0.27	0.46	0.17	0.20	0.28	2.37	1.40	0.30	0.63	0.39	0.51	0.63	0.74	0.14	0.29	0.28	0.27
	Max	0.33	0.55	0.23	0.23	0.33	2.88	1.70	0.35	0.70	0.45	0.61	0.69	0.92	0.15	0.36	0.32	0.29
	Count	10	10	10	10	10	10	10	10	10	10	10	10	10	9	9	9	9
female	**Mean**	**0.28**	**0.53**	**0.20**	**0.20**	**0.31**	**2.79**	**1.70**	**0.33**	**0.69**	**0.44**	**0.58**	**0.69**	**1.00**	**0.14**	**0.34**	**0.32**	**0.29**
	SD	0.01	0.02	0.01	0.01	0.01	0.14	0.10	0.02	0.02	0.01	0.03	0.06	0.06	0.01	0.01	0.02	0.01
	Range	0.02	0.06	0.01	0.02	0.03	0.39	0.30	0.04	0.08	0.03	0.07	0.21	0.16	0.02	0.04	0.05	0.03
	Min	0.28	0.49	0.20	0.19	0.30	2.53	1.50	0.31	0.65	0.43	0.55	0.64	0.89	0.13	0.31	0.30	0.27
	Max	0.30	0.55	0.21	0.21	0.33	2.92	1.80	0.35	0.73	0.46	0.62	0.85	1.05	0.15	0.35	0.35	0.30
	Count	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
ohallorani																		
male	**Mean**	**0.29**	**0.52**	**0.23**	**0.21**	**0.35**	**2.84**	**1.69**	**0.32**	**0.73**	**0.46**	**0.64**	**0.73**	**0.90**	**0.16**	**0.39**		
	SD	0.01	0.00	0.00	0.01	0.01	0.07	0.02	0.00	0.02	0.01	0.03	0.02	0.07	0.01	0.01		
	Range	0.03	0.00	0.00	0.03	0.02	0.15	0.04	0.01	0.04	0.02	0.07	0.03	0.05	0.02	0.02		
	Min	0.27	0.52	0.23	0.20	0.34	2.77	1.66	0.32	0.71	0.45	0.62	0.71	0.80	0.15	0.38		
	Max	0.30	0.52	0.23	0.23	0.36	2.92	1.70	0.33	0.75	0.47	0.69	0.74	0.95	0.17	0.40		

continued next page

TABLE 2. (continued)

Species		Length							Width									
		Mandib plate	Head	Callo-site region	Disc	Labium	Body	Wing	Mandib plate	Head outer eye	Inter ocul	Callo-site region	Disc	abdom	AI	AII	AIII	AIV
	Count	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	0
female	**Mean**	**0.31**	**0.54**	**0.22**	**0.21**	**0.37**	**2.91**	**1.68**	**0.32**	**0.74**	**0.47**	**0.63**	**0.74**	**1.01**	**0.17**	**0.39**	**0.35**	**0.33**
	SD	0.01	0.02	0.00	0.01	0.01	0.06	0.04	0.02	0.01	0.01	0.01	0.02	0.04	0.01	0.01	0.00	0.01
	Range	0.02	0.05	0.01	0.02	0.02	0.16	0.10	0.04	0.02	0.02	0.01	0.04	0.09	0.02	0.02	0.01	0.02
	Min	0.30	0.52	0.22	0.21	0.36	2.84	1.60	0.30	0.73	0.47	0.63	0.72	0.96	0.16	0.38	0.35	0.33
	Max	0.32	0.57	0.23	0.23	0.38	3.00	1.70	0.34	0.75	0.49	0.64	0.76	1.05	0.18	0.40	0.36	0.35
	Count	5	5	5	5	4	5	5	5	5	5	5	5	5	5	5	3	3
peregrinus																		
male	**Mean**	**0.29**	**0.51**	**0.19**	**0.20**	**0.34**	**2.63**	**1.66**	**0.31**	**0.67**	**0.42**	**0.56**	**0.61**	**0.87**	**0.15**	**0.33**	**0.29**	**0.27**
	SD	0.01	0.02	0.01	0.01	0.01	0.15	0.16	0.01	0.04	0.02	0.04	0.09	0.05	0.01	0.03	0.04	0.03
	Range	0.03	0.06	0.03	0.03	0.04	0.43	0.56	0.04	0.11	0.05	0.12	0.33	0.18	0.02	0.10	0.11	0.13
	Min	0.28	0.49	0.18	0.19	0.33	2.45	1.40	0.29	0.63	0.40	0.52	0.36	0.80	0.14	0.28	0.24	0.23
	Max	0.31	0.55	0.21	0.22	0.37	2.88	1.96	0.33	0.74	0.45	0.64	0.69	0.98	0.16	0.38	0.35	0.30
	Count	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
female	**Mean**	**0.31**	**0.54**	**0.20**	**0.22**	**0.34**	**2.80**	**1.82**	**0.31**	**0.73**	**0.46**	**0.63**	**0.70**	**1.04**	**0.15**	**0.36**	**0.35**	**0.31**
	SD	0.01	0.02	0.01	0.01	0.01	0.14	0.11	0.01	0.02	0.01	0.02	0.03	0.03	0.01	0.02	0.02	0.01
	Range	0.03	0.06	0.02	0.03	0.03	0.39	0.32	0.03	0.04	0.02	0.05	0.10	0.11	0.03	0.05	0.06	0.03
	Min	0.30	0.52	0.20	0.20	0.33	2.57	1.64	0.30	0.70	0.45	0.59	0.64	0.98	0.13	0.33	0.33	0.30
	Max	0.33	0.58	0.22	0.23	0.37	2.96	1.96	0.33	0.74	0.47	0.64	0.74	1.09	0.16	0.38	0.39	0.33
	Count	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
petilus																		
male	**Mean**	**0.24**	**0.47**	**0.20**	**0.21**	**0.30**	**2.58**	**0.25**	**0.58**	**0.38**	**0.52**	**0.59**	**0.78**	**0.15**	**0.24**	**0.21**	**0.22**	
	SD	0.02	0.03	0.01	0.02	0.02	0.14	0.01	0.03	0.01	0.02	0.03	0.04	0.01	0.02	0.01	0.02	
	Range	0.07	0.08	0.05	0.05	0.06	0.40	0.04	0.08	0.04	0.08	0.09	0.12	0.01	0.06	0.03	0.05	

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TABLE 2. (continued)

Species		Length							Width						AI	AII	AIII	AIV
		Mandib plate	Head	Callo-site region	Disc	Labium	Body	Wing	Mandib plate	Head outer eye	Inter ocul	Callo-site region	Disc	abdom				
	Min	0.21	0.43	0.18	0.18	0.33	2.37	0.23	0.54	0.36	0.47	0.55	0.74	0.14	0.22	0.20	0.20	
	Max	0.28	0.51	0.23	0.23	0.27	2.77	0.27	0.62	0.40	0.55	0.64	0.86	0.15	0.28	0.23	0.25	
	Count	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	8	
female	**Mean**	**0.25**	**0.48**	**0.22**	**0.23**	**0.31**	**2.61**	**0.13**	**0.67**	**0.42**	**0.58**	**0.65**	**0.87**	**0.15**	**0.33**	**0.29**	**0.27**	
	SD	0.02	0.02	0.02	0.02	0.03	0.15	0.01	0.04	0.02	0.04	0.03	0.05	0.01	0.03	0.04	0.03	
	Range	0.05	0.07	0.06	0.07	0.07	0.43	0.04	0.11	0.05	0.12	0.08	0.18	0.02	0.10	0.11	0.13	
	Min	0.23	0.45	0.19	0.19	0.28	2.45	0.29	0.63	0.40	0.52	0.62	0.80	0.14	0.28	0.24	0.23	
	Max	0.28	0.52	0.25	0.26	0.35	2.88	0.33	0.74	0.45	0.64	0.70	0.98	0.16	0.38	0.35	0.30	
	Count	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
roy																		
male	**Mean**	**0.20**	**0.45**	**0.17**	**0.19**	**0.46**	**2.39**	**0.21**	**0.64**	**0.39**	**0.54**	**0.61**	**0.97**	**0.18**	**0.35**	**0.32**	**0.32**	
	SD	0.00	0.01	0.01	0.02	0.02	0.03	0.02	0.00	0.01	0.00	0.03	0.02	0.00	0.04	0.00	0.01	
	Range	0.01	0.02	0.02	0.02	0.03	0.04	0.03	0.00	0.02	0.00	0.05	0.02	0.00	0.05	0.01	0.01	
	Min	0.20	0.44	0.16	0.18	0.45	2.37	0.20	0.64	0.38	0.54	0.59	0.96	0.18	0.33	0.32	0.32	
	Max	0.21	0.46	0.18	0.20	0.48	2.41	0.23	0.64	0.40	0.54	0.64	0.98	0.18	0.38	0.33	0.33	
	Count	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
female	**Mean**	**0.21**	**0.43**	**0.19**	**0.18**	**0.45**	**2.63**	**0.23**	**0.65**	**0.41**	**0.54**	**0.67**	**0.98**	**0.17**	**0.36**	**0.35**	**0.29**	
	SD	0.01	0.01	0.01	0.01	0.01	0.08	0.01	0.00	0.01	0.00	0.02	0.00	0.01	0.03	0.00	0.05	
	Range	0.01	0.01	0.02	0.01	0.01	0.12	0.01	0.00	0.02	0.00	0.03	0.00	0.02	0.04	0.00	0.07	
	Min	0.20	0.43	0.18	0.18	0.44	2.57	0.23	0.65	0.40	0.54	0.66	0.98	0.16	0.34	0.35	0.26	
	Max	0.21	0.44	0.20	0.19	0.45	2.69	0.24	0.65	0.42	0.54	0.69	0.98	0.18	0.38	0.35	0.33	
	Count	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
safordi																		
male	**Mean**	**0.31**	**0.52**	**0.20**	**0.20**	**0.29**	**2.51**	**1.54**	**0.31**	**0.65**	**0.41**	**0.57**	**0.59**	**0.74**	**0.14**	**0.37**	**0.33**	**0.30**

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TABLE 2. (continued)

Species		Length							Width									
		Mandib plate	Head	Callo-site region	Disc	Labium	Body	Wing	Mandib plate	Head outer eye	Inter ocul	Callo-site region	Disc	abdom	AI	AII	AIII	AIV
	SD	0.01	0.01	0.01	0.01	0.01	0.07	0.06	0.02	0.02	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01
	Range	0.03	0.04	0.04	0.05	0.02	0.24	0.20	0.06	0.07	0.04	0.05	0.05	0.06	0.01	0.04	0.04	0.03
	Min	0.30	0.50	0.19	0.18	0.28	2.41	1.40	0.29	0.62	0.40	0.54	0.59	0.71	0.14	0.34	0.31	0.29
	Max	0.33	0.54	0.23	0.23	0.30	2.65	1.60	0.35	0.69	0.44	0.59	0.64	0.77	0.15	0.38	0.35	0.32
	Count	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	8	8
female	**Mean**	**0.30**	**0.51**	**0.20**	**0.20**	**0.27**	**2.54**	**1.67**	**0.30**	**0.66**	**0.42**	**0.57**	**0.62**	**0.89**	**0.16**	**0.37**	**0.33**	**0.31**
	SD	0.01	0.01	0.01	0.01	0.01	0.09	0.04	0.01	0.02	0.01	0.02	0.02	0.04	0.01	0.01	0.01	0.01
	Range	0.02	0.03	0.03	0.03	0.04	0.28	0.10	0.05	0.05	0.03	0.08	0.06	0.12	0.02	0.04	0.02	0.03
	Min	0.29	0.49	0.19	0.18	0.25	2.41	1.62	0.28	0.64	0.41	0.54	0.59	0.86	0.15	0.35	0.34	0.30
	Max	0.31	0.52	0.22	0.21	0.29	2.69	1.72	0.33	0.69	0.44	0.62	0.65	0.98	0.17	0.39	0.32	0.33
	Count	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
slateri																		
male	**Mean**	**0.30**	**0.55**	**0.22**	**0.22**	**0.34**	**3.13**	**1.76**	**0.32**	**0.74**	**0.46**	**0.65**	**0.71**	**1.01**	**0.17**	**0.42**	**0.36**	**0.31**
	SD	0.01	0.01	0.01	0.01	0.01	0.06	0.04	0.01	0.01	0.01	0.02	0.03	0.03	0.00	0.01	0.00	0.01
	Range	0.02	0.02	0.02	0.01	0.01	0.12	0.10	0.02	0.02	0.02	0.03	0.05	0.07	0.01	0.02	0.01	0.03
	Min	0.29	0.54	0.21	0.21	0.34	3.08	1.72	0.31	0.74	0.45	0.64	0.69	0.98	0.16	0.41	0.35	0.30
	Max	0.31	0.56	0.23	0.22	0.35	3.20	1.82	0.33	0.76	0.47	0.67	0.74	1.05	0.17	0.43	0.36	0.33
	Count	4	4	4	4	4	3	4	4	4	4	4	4	4	4	4	3	3
female	**Mean**	**0.31**	**0.56**	**0.24**	**0.23**	**0.33**	**3.08**	**1.81**	**0.33**	**0.75**	**0.48**	**0.66**	**0.74**	**1.02**	**0.16**	**0.42**	**0.36**	**0.31**
	SD	0.01	0.01	0.01	0.01	0.01	0.09	0.02	0.01	0.02	0.02	0.02	0.02	0.13	0.01	0.00	0.01	0.00
	Range	0.02	0.02	0.01	0.02	0.02	0.20	0.04	0.02	0.03	0.04	0.04	0.03	0.027	0.03	0.01	0.03	0.01
	Min	0.30	0.55	0.23	0.23	0.33	2.96	1.80	0.33	0.74	0.46	0.64	0.74	0.84	0.15	0.42	0.35	0.31
	Max	0.32	0.57	0.24	0.25	0.35	3.16	1.84	0.35	0.77	0.50	0.68	0.77	1.11	0.18	0.43	0.38	0.32
	Count	4	4	4	4	4	4	3	4	4	4	4	4	4	4	4	3	3

Male genitalia. The male genitalia of the Thaumastocorinae are highly specialised, with exaggerated asymmetry in the pygophore and paramere, and a greatly simplified aedeagus. The male genitalia have been examined by Drake and Slater (1957), Kumar (1964), and Cassis *et al*. (1999) all of whom referred to the remarkable modification of the pygophore, which is oriented either to the left or the right; and in some cases fluctuating asymmetry is known within species. The pygophore is modified into a tube-like structure, which is held in position by a tergal outgrowth of the pygophore, which Cassis *et al*. (1999) referred to as the pygophoral process (= lateral projection of Drake & Slater 1957). In this work it is referred to as the pygophoral lock. During copulation the pygophoral lock is uncoupled from the eighth abdominal sternite and the pygophore is ventroflexed in its entirety, so that the male genital complex is positioned for engagement with the female genital tract. There is modification in the morphology of the pygophoral lock, which has proven to be a discrete character for separating *Thaumastocoris* species. In conjunction with the pygophore, the left paramere has also become both exaggerated and species specific. The morphology of the left paramere is unlike those seen in other Heteroptera, with a very simple and narrow articulating base, which is without major modification, and an elaborate apex, which is highly various, and can be club-shaped (Figure 18A; 19A,B), scalloped (Figure 18D,G,H), keeled (Figure 19D) or toothed (Figure 18E,F). The right paramere has been lost in all Thaumastocorinae. The aedeagus is consistent with other Heteroptera, in that it is divided into a basal articulatory process, here referred to as the phallobase (= basal plate of Kumar 1964); a narrow gutter-like phallotheca, which is weakly sclerotized and opens dorsally along its entire length (lateral in resting position); and a largely undifferentiated endosoma. The endosoma sometimes has a weak sclerotization basally that has the appearance of a basal sclerite, although most often it is not strongly demarcated. Drake and Slater (1957) made mention of the simplicity of the aedeagus, and did not find the endosoma to be differentiated into a conjunctiva and vesica. Significant variation in the endosoma within *Thaumastocoris* was not evident, although minor differences in the sclerotization of the basal sclerite were noted within and between species. In this work endosomal morphology is not considered as important in differentiating species.

Female genitalia. The external female genitalia is reduced; the apex of tergite nine bent downward resting on sternite seven, sternite eight consists of two small lateral plates. The female genitalia has been examined by Drake and Slater (1957) and Kumar (1964). The internal female genitalia comprises a transverse baglike bursa copulatrix, a short common oviduct, and paired lateral oviducts with ball-shaped reservoirs. The morphology of these structures is very similar to that found in *Proxylastodoris kuscheli* van Doesburg, Cassis and Monteith (van Doesburg *et al.* 2010).

Biology

Host plant associations. *Thaumastocoris* has the broadest host range within the Thaumastocorinae (Cassis *et al*. 1999). Host plant associations are documented for 12 of the 14 species of *Thaumastocoris* (Table 3). Eight plant families are recorded for *Thaumastocoris*, and most species are associated with the Myrtaceae. Six of these species (*T. freomooreae* n.sp., *T. kalaako* n.sp., *T. majeri* n.sp., *T. nadeli* n.sp., *T. ohallorani* n.sp., and *T. peregrinus*) are associated with *Eucalyptus*, and a further two species, *T. safordi* n.sp. and *T. slateri* n.sp., with the *Corymbia* group of eucalypts. *Thaumastocoris* species are known from 29 species of eucalypts. The association of Heteroptera with *Eucalyptus* is not common; unlike the sternorrhynchous and auchenorrhychous Hemiptera, there are few true bug clades that have successfully adapted to the plant defences of *Eucalyptus* (Cassis *et al*. 1999; Cassis and Gross 2002; Cassis *et al*. 2007).

A number of eucalypts are host to more than one *Thaumastocoris* species. *Thaumastocoris freomooreae, T. nadeli,* and *T. peregrinus* have been taken from a comparatively large number of eucalypt species, and all are found on *E. sideroxylon. Thaumastocoris freomooreae* and *T. nadeli* have also been collected on *E. wandoo*. Urban plantings of *E. camaldulensis* are utilised by *T. nadeli* and *T. peregrinus* on the western and eastern coast of the continent, respectively.

Three genera of Myrtaceae are exploited by *T. petilus*; it is recorded on four species of *Melaleuca*, and *Malleostemon* and *Thryptomene*, although these latter two records are possibly sitting records. *Thaumastocoris nadeli* appears to have the broadest host range, spanning four plant families. In addition to three myrtaceous genera (*Eucalyptus*, *Agonis* and *Kunzea*), this species has also been collected on species belonging to the plant families Fabaceae, Lamiaceae, and Proteaceae. Again, as only one or two specimens were collected from the latter two families, these may also be sitting records.

Thaumastocoris is also known from the other iconic Australian plant genus, *Acacia* (Fabaceae), with three species

reported on wattles: *T. nadeli*, *T. safordi*, and *T. australicus*. However, there is some doubt on the *T. safordi* record from *Acacia falcata* as the specimens reported herein were collected as part of a survey in a *Corymbia maculata* forest.

Only two of the 12 species of *Thaumastocoris* are not associated with Myrtaceae. *Thaumastocoris hackeri* is recorded on species from the plant families Elaeocarpaceae, Cunoniaceae, and Rubiaceae, and *T. roy* from the Malvaceae.

TABLE 3. Host plant species and host plant families of species of *Thaumastocoris*.

Thaumastocoris species	Host plant Species	Host plant family	Reference
australicus	*Acacia cunninghami*	Fabaceae	Kumar (1964)
	Acacia maidenii	Fabaceae	Slater (1973)
	Acacia saligna	Fabaceae	this work
	Eucalyptus populnea populnea	Myrtaceae	Cassis *et al* (1999)
busso	Unknown		
freomooreae	*Eucalyptus astringens*	Myrtaceae	this work
	Eucalyptus calycogona	Myrtaceae	this work
	Eucalyptus costata	Myrtaceae	this work
	Eucalyptus costata murrayana	Myrtaceae	this work
	Eucalyptus longicornis	Myrtaceae	this work
	Eucalyptus leptophylla	Myrtaceae	this work
	Eucalyptus salubris	Myrtaceae	this work
	Eucalyptus sargentii	Myrtaceae	this work
	Eucalyptus sideroxylon	Myrtaceae	this work
	Eucalyptus porosa	Myrtaceae	this work
	Eucalyptus wandoo	Myrtaceae	this work
	Eucalyptus woodwardi	Myrtaceae	this work
hackeri	*Elaeocarpus obovatus*	Elaeocarpaceae	Rose (1965)
	Schizomeria ovata	Cunoniaceae	Cassis *et al* (1999)
	Unknown	Rubiaceae	this work
kalaako	*Eucalyptus* sp.	Myrtaceae	this work
macqueeni	Unknown		
majeri	*Eucalyptus rudis*	Myrtaceae	this work
nadeli	*Acacia* sp.	Fabaceae	this work
	Agonis flexuosa	Myrtaceae	this work
	Eucalyptus camaldulensis	Myrtaceae	this work
	Eucalyptus nicholii	Myrtaceae	this work
	Eucalyptus scoparia	Myrtaceae	this work
	Eucalyptus sideroxylon	Myrtaceae	this work
	Eucalyptus wandoo	Myrtaceae	this work
	Kunzea glabrescens	Myrtaceae	this work
	Dryandra sessilis	Proteaceae	this work
	Hemiandra glabra	Lamiaceae	this work
ohallorani	*Eucalyptus porosa*	Myrtaceae	this work
peregrinus	*Corymbia citriodora* ssp.*citriodora*	Myrtaceae	Noack (2002)
	Eucalyptus botryoides	Myrtaceae	Jacobs & Neser (2005)
	Eucalyptus camaldulensis	Myrtaceae	Noack (2002)
	Eucalyptus dorrigoensis	Myrtaceae	Jacobs & Neser (2005)
	Eucalyptus globulus ssp. *globulus*	Myrtaceae	Noack (2002)
	Eucalyptus globulus ssp. *bicostata*	Myrtaceae	Noack (2002)
	Eucalyptus globulus ssp. *maidenii*	Myrtaceae	Noack (2002)
	Eucalyptus grandis	Myrtaceae	Jacobs & Neser (2005)
	Eucalyptus microcorys	Myrtaceae	Noack & Coviella (2006)
	Eucalyptus nicholii	Myrtaceae	Noack (2002)

continued next page

TABLE 3. (continued)

Thaumastocoris species	Host plant Species	Host plant family	Reference
peregrinus	*Eucalyptus saligna*	Myrtaceae	Noack (2002)
	Eucalyptus scoparia	Myrtaceae	Noack (2002)
	Eucalyptus sideroxylon	Myrtaceae	Noack & Coviella (2006)
	Eucalyptus viminalis	Myrtaceae	Noack (2002)
	Eucalyptus tereticornis	Myrtaceae	Noack (2002)
	Eucalyptus punctuate	Myrtaceae	Noack (2002)
petilus	*Malleostemon tuberculatus*	Myrtaceae	this work
	Melaleuca cucullata	Myrtaceae	his work
	Melaleuca glomerata	Myrtaceae	this work
	Melaleuca rhaphiophylla	Myrtaceae	Slater (1973)
	Melaleuca uncinata	Myrtaceae	this work
	Thryptomene aspera ssp *aspera*	Myrtaceae	this work
roy	*Argyrodendron actinophyllum*	Malvaceae	this work
safordi	*Acacia falcata*	Fabaceae	this work
	Corymbia citriodora ssp.*citriodora*	Myrtaceae	this work
	Corymbia maculata	Myrtaceae	this work
	Corymbia citriodora ssp. *variegata*	Myrtaceae	this work
	Eucalyptus nicholii	Myrtaceae	this work
slateri	*Corymbia citriodora* ssp. *variegata*	Myrtaceae	this work

Feeding behaviour. Cassis *et al.* (1999) tabulated a comprehensive list of microhabitats for Thaumastocoridae. *Thaumastocoris peregrinus* and *T. safordi* both feed on the fully developed leaves of their hosts. It has not been determined which tissues of the leaves are used. Newly hatched nymphs from both species probe the leaf surface almost immediately after hatching (AEN personal observation).

Mating behaviour. *Thaumastocoris peregrinus* regularly mated when large numbers of both sexes were placed in containers with whole leaves. This was particularly so when they became agitated by movement of their container or being moved between containers.

Two distinct mating behaviours were observed, which we describe as 'riding' and 'rushing.' Both behaviours were observed in pre- and post-copulation periods. Riding males are positioned on the dorsum of the female, in the same direction, and remain stationary. We did not determine if this behaviour represented mate-guarding, but riding was observed for at least 45 minutes, whereas females would continue to walk, feed, and groom. On occasion, especially if containers were agitated, males would briefly mount and ride on other males. More rarely, we observed what may have been male-male competitive behaviour, with males attempting to dislodge riding males by positioning their mandibular plates between the heads of a copulating pair, and climbing onto the head of the female and pushing the mandibular plates of the riding male upwards. These actions however were not observed to result in decoupling.

The rushing behaviour refers to males, and can be described as follows; whilst riding, males lunge three or four steps towards the female's head and sweep their antennae in a broad arc over the female's head and/or antennae, then return to a position parallel to her body. This movement is vigorous and sudden. This behaviour was observed frequently, and on one occasion continuously for 12 minutes, although the frequency slowed after five minutes. During this behaviour females are motionless with their abdomens weakly bent downwards so as to produce space between her wings and her abdomen. Intermittently, males would then move back caudally on the female, ventro-flexing both their abdomen and pygophore. During this action the paramere could be seen distinctly moving from a resting position (and in contact with the pygophoral lock) to the opposite margin of the genital opening and then returning to rest. In this sequence the aedeagus was not exposed.

Once apparently receptive, females, presumably to facilitate copulation, would return their abdomen to the resting position under their wings. The male then ventro-flexes both abdomen and pygophore, and the apex of the pygophore is then inserted into the genital chamber of the female. Copulation was observed to continue for at least four minutes.

Egg laying behaviour. The eggs of Thaumastocoridae are large relative to the body size of the female (Drake and Slater 1957; Couturier *et al.* 2002; Noack and Rose 2007). Noack and Rose (2007) examined the fecundity of a small number of specimens of *T. peregrinus* and *T. safordi* in the laboratory, and established that both mated and unmated females can lay approximately two eggs per day. In the field there are quite marked differences in the egg laying behaviour of *T. peregrinus* and *T. safordi*. *Thaumastocoris peregrinus* lay their eggs adjacent to debris, leaf scars, or the raised venation on the abaxial surface of a leaf. Oviposition is seemingly *ad hoc* and clusters of large numbers of eggs are not uncommon. In contrast, *T. safordi* lay their eggs in rows, usually on smooth leaf surface, and in small numbers.

Parasitoids. Two species of parasitoid wasps, belonging to the hymenopteran family Mymaridae, have been established as egg parasites of *T. peregrinus*. These species include *Cleruchoides noackae* Lin & Huber, and an unidentified species of *Stethynium* Enock (Lin, Huber, & la Salle 2007). A single wasp emerges from each parasitised thaumastocorid egg, exiting via the operculum.

Taxonomy

Thaumastocoris Kirkaldy, 1908

Thaumastotherium Kirkaldy, 1908: 768; Type species: *Thaumastotherium australicum* Kirkaldy, 1908, by monotypy.
Thaumastocoris Kirkaldy 1908: 768 [corrigenda] justified emendation of *Thaumastotherium* Kirkaldy, 1908; Type species: *Thaumastocoris australicus* Kirkaldy, 1908, by monotypy; Drake and Slater 1957: 365 (description); Cassis and Gross 1995: 393 (catalogue).

Diagnosis. *Thaumastocoris* is recognized by the following character states: body strongly dorsoventrally compressed and elongate (Figure 3–9); small, with most species between 2–3.5 mm in length (Table 2); dorsum moderately polished, with shallow to deep setose punctures (Figure 3–9; 15A,D; 10D); head broad; eyes pedicellate; elongate conspicuous mandibular plates (Figure 10A; 11A; 15A; 16A); pronotum weakly to strongly constricted medially (Figure 15D; 14D; 17D); femora incrassate (Figure 11A,B; 13B; 15B); tibial teeth conspicuous (Figure 13F; 17F); and fossula spongiosa elongate (Figure 12F; 13F).

Redescription. Colouration. Dorsum variable, but typically yellowish brown with contrasting brown to fuscous markings (Figure 3–9). *Head*: mostly cream to light brown with vertex and mandibular plates often darker; lateral aspects of mandibular plates and genae frequently with brown to fuscous stripe. *Antennae*: straw to yellowish brown often with brown to fuscous regions on subapical AII–AIV. *Labium*: straw to brown, apex LIV darker. *Pronotum*: mostly yellowish brown, midline of callosite region sometimes darker; pronotal disc cream to yellowish brown. *Thoracic pleura and sterna*: typically yellowish brown to dark brown, pleura often darker dorsally; prosternum cream to fuscous. *Scutellum*: yellowish brown to dark brown, posterior half of midline lighter. *Hemelytra*: yellowish brown, clavus lighter; membrane cream to light yellowish brown often apically infused with dark brown to fuscous. *Legs*: straw-coloured, with distal margin of second tarsomere brown. *Abdomen*: light to dark brown. **Texture.** Dorsum moderately polished, with scattered shallow to deep setose punctures. *Head*: vertex mostly impunctate, with transverse puncticulate rows often visible, epicranial suture with shallow to moderately deep irregular punctures; areas of vertex adjacent to eyes, medial to ocelli impunctate; mandibular plates irregularly punctate, often denser posteriorly (Figure 15A; 16A; 10A; 12A; 14A). *Pronotum*: callosite region sparsely punctate, punctures shallow, often denser along midline and anterolateral angles; pronotal disc densely and regularly punctate, punctures deep, posterolateral angles impunctate (Figure 10D; 14D; 15D; 16E). *Thoracic pleura and sterna*: pleura variously punctated with fine to deep punctures (Figure 11E; 13D; 15E); sterna mostly with sparse, irregular, shallow punctures; mesosternum often polished. *Hemelytra*: clavus and corium with uniform distribution of deep punctures (Figure 11F; 14F; 15F). *Abdomen*: impunctate, moderately to highly polished. **Vestiture.** Dorsum with uniform distribution of setose punctures, setae short erect straw-coloured. Lateral and ventral aspects of body irregularly to uniformly clothed with erect to decumbent setae (Figure 11E; 13E; 14E), often more densely distributed on ventral aspect of mandibular plates, adjacent to bucculae and gula (Figure 11B; 14B). Antennae with uniform distribution of decumbent setae intermixed with fine erect setae; AIII–AIV often with dorsal and ventral margins bare (Figure 10C; 11C; 12C; 15C). Femora with short decumbent setae (Figure 15B); tibia with longer denser setae distally. **Structure.** *Head*: transverse weakly declivent; mandibular plates elongate and broad, surpassing clypeus

by clypeal length or more, briefly to completely contiguous along medial margin (Figure 3–9; 14A; 16A,B; 11A), weakly to strongly flared anteriorly, weakly to strongly excavate dorsally (Figure 15A; 12A; 11A), lateral margins rounded to strongly recurved; genae sometimes swollen and truncate anteriorly; vertex weakly swollen, epicranial suture obvious; bucculae, weakly to strongly arcuate (Figure 16B; 15B), posterior margin sometimes strongly explanate so as to be reinform (Figure 13B; 14B); gula flat to distinctly excavate. *Eyes*: weakly to strongly pedicellate (Figure 5A; 7C,D; 4C,D). *Antennae*: AI short, cylindrical; AII approximately double length of AI, cylindrical to dorsoventrally compressed, often weakly expanded distally, sometimes with 'antennal pit' visible on subanterolateral margin (Figure 16D); AIII approximately same length as AII, cylindrical to dorsoventrally compressed, sometimes weakly expanded distally; AIV slightly shorter than AII and AII, dorsoventrally compressed and weakly lanceolate (Figure 10C; 15C). *Labium*: short, not surpassing anterior margin of prosternum to long, reaching subposterior margin of prosternum. *Pronotum*: weakly to strongly constricted medially; callosite region subequal to shorter than disc, disc often broader; callosite region often depressed along midline; calli weakly swollen; anterolateral angles rounded to distinctly tuberiferous (Figure 15D; 16E); lateral margin of disc weakly arcuate; disc sometimes slightly raised. *Thoracic pleura and sterna*: propleuron sometimes moderately to strongly ventrally expanded, approaching midline of body (Figure 10B; 15B), posteroventral angle rounded, weakly swollen, to distinctly tuberiferous (Figure 10B,E); metapleuron sometimes weakly swollen posteroventrally; prosternum flat (Figure 10B), swollen (Figure 12B), or excavate anteriorly, sometimes bipartite and posteriorly reduced subcardiform (Figure 15B), often with posterior lateral margins rounded, flared or truncate. *Hemelytra*: typically submacropterous (Figure 3–4; 6–9), extending to submarginal TIX or basal half of pygophore, sometimes macropterous (Figure 5A); medial margin of corium typically convex medially becoming weakly excavate distally, apex of corium at membrane usually narrowed, medial margin typically less than 45° to costal margin. *Legs*: fore and mesofemora moderately to strongly incrassate (Figure 11B; 15B); tibia slightly swollen subapically, fossula spongiosa elongate, reaching distal half or third of second tarsomere (Figure 13F; 12F); tibial teeth on inner apical margin, conspicuous and variable in number (Figure 13F; 17F). *Male Genitalia*: pygophore ovoid sometimes ellipsoid (Figure 19F); pygophoral lock elongated and variously modified apically, typically narrowing to point (Figure 19B,C) or concave (Figure 19E,F) or rounded (Figure 18A) or oblique angle (Figure 19A), often weakly trapezoid with angles flared and pointed (Figure 18C) or flared with rounded angles (Figure 18G,H), others subrectangular and recurved (Figure 18B) or with a medial notch (Figure 18D); paramere heavily sclerotized, usually subquadrate (Figure 19A,B,C) to subquadrangular (Figure 18B) or ovoid (Figure 18A; 19F), others more elongate and apically spatulate (Figure 18D,G,H) or recurved (Figure 18C; 19E), sometimes with a medial keel (Figure 19D) or ovate with a horn like projection apically (Figure 18E,F).

Distribution. *Thaumastocoris* is endemic to Australia. *Thaumastocoris peregrinus* has been accidentally introduced to southern Africa and South America.

Remarks. Key characters that differentiate the four genera of the Thaumastocorinae are summarized in Table 1. *Thaumastocoris* is best recognized by the flat to strongly excavated mandibular plates, which are often anterolaterally flared and recurved. In contrast the mandibular plates of *Baclozygum* Bergroth, *Onymocoris* Drake & Slater and *Wechina* Drake & Slater are convex. Additionally, the mandibular plates of *Thaumastocoris* are usually contiguous medially, often for their entire length. However, mandibular plate contiguity is slight in the monotypic genus *Wechina,* only contiguous in one of the four species of *Baclozygum* (*B. bergrothi* Drake & Slater), and nonexistent in all species of *Onymocoris*. The labium of *Thaumastocoris* is generally shorter than those of the other three thaumastocorine genera, being short to moderate in length, and never reaching beyond the posterior margin of the prosternum, with the labium of most species just reaching the anterior margin of the forecoxae. The length of the labium in *Baclozygum*, *Onymocoris,* and *Wechina* is generally longer than the posterior margin of the prosternum.

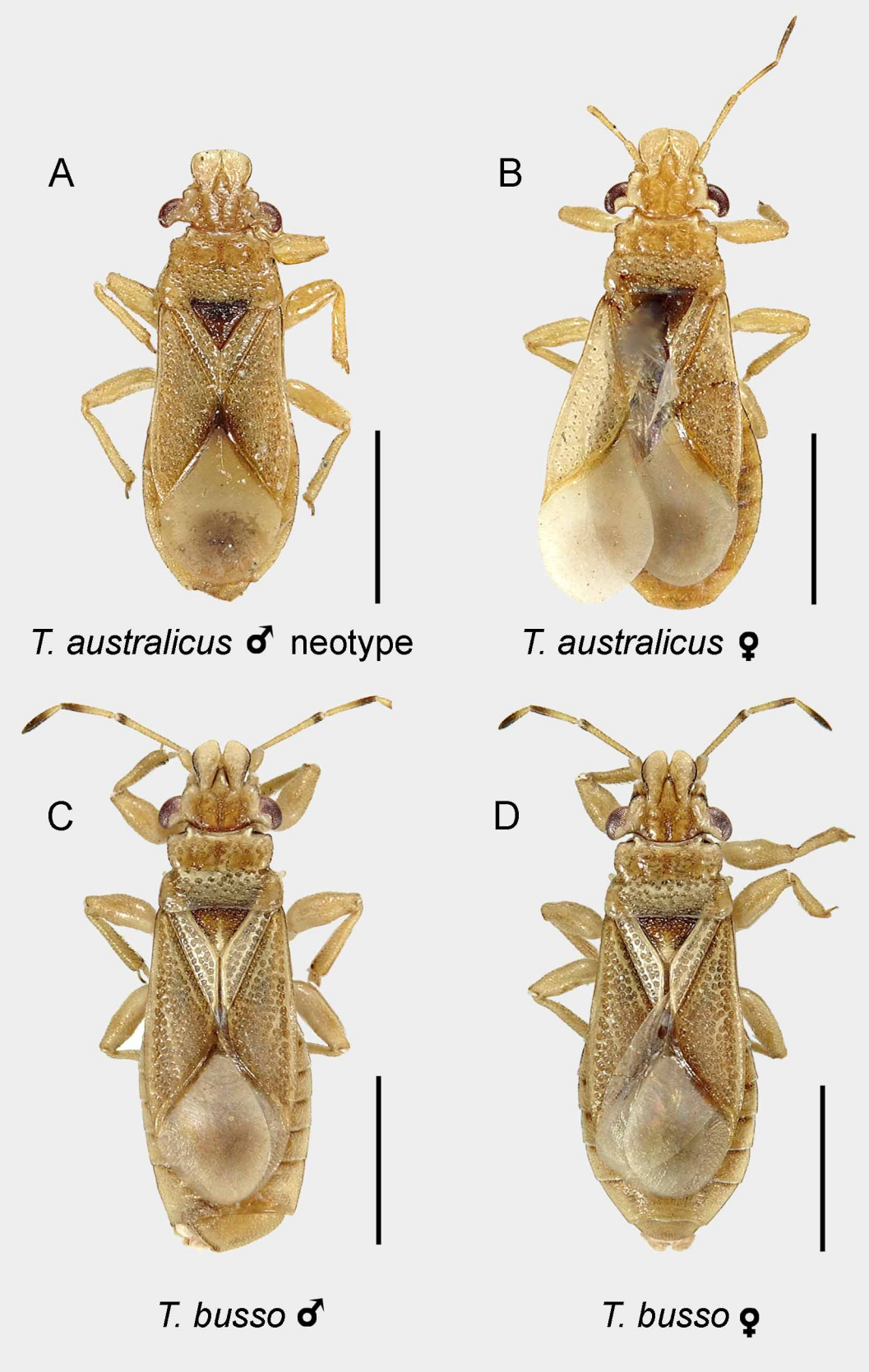

FIGURE 3. Habitus, dorsal view. **A** and **B** *Thaumastocoris australicus*. **C** and **D** *Thaumastocoris busso*. Scale bar = 1mm.

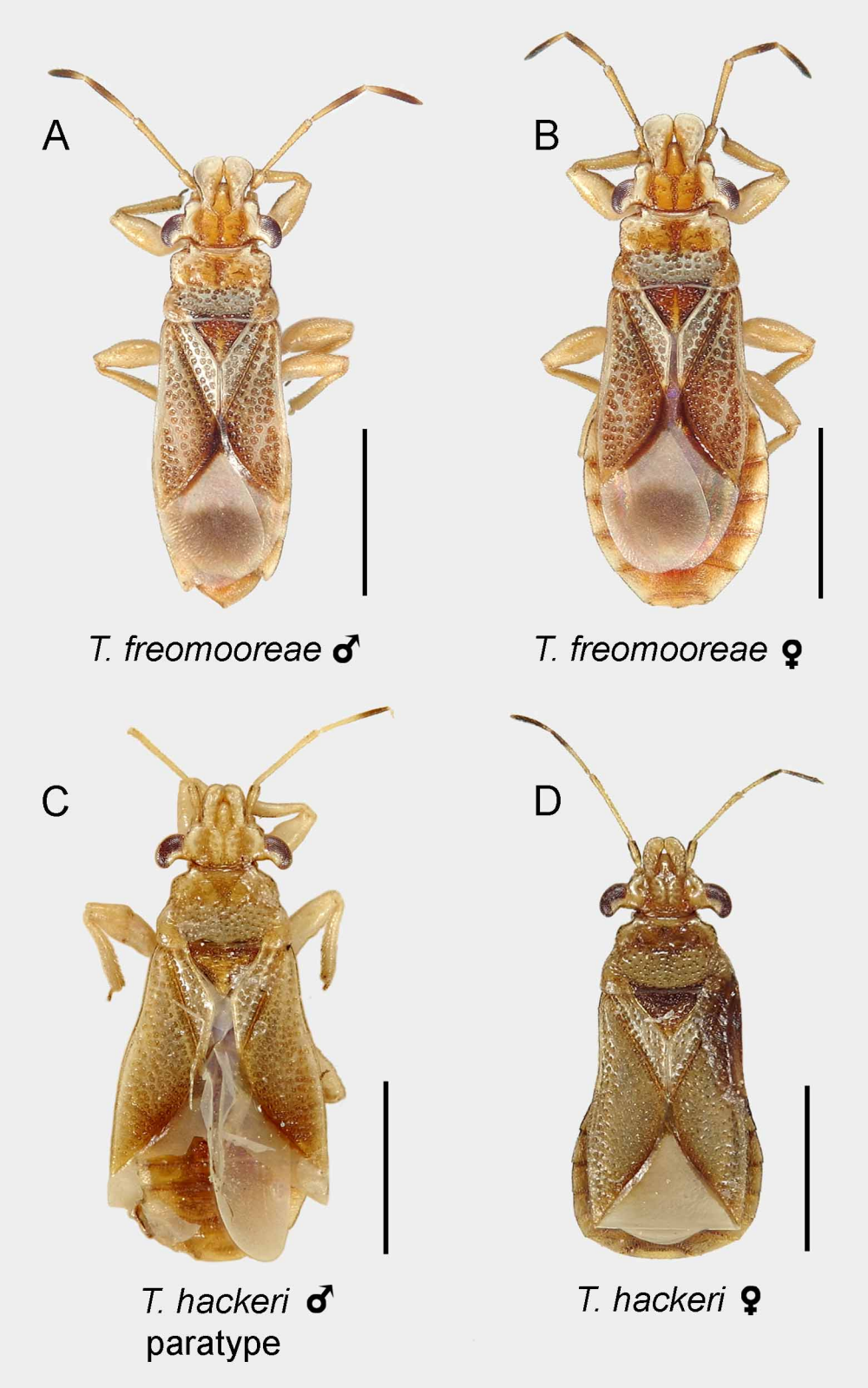

FIGURE 4. Habitus, dorsal view. **A** and **B** *Thaumastocoris freomooreae*. **C** and **D** *Thaumastocoris hackeri*. Scale bar = 1mm.

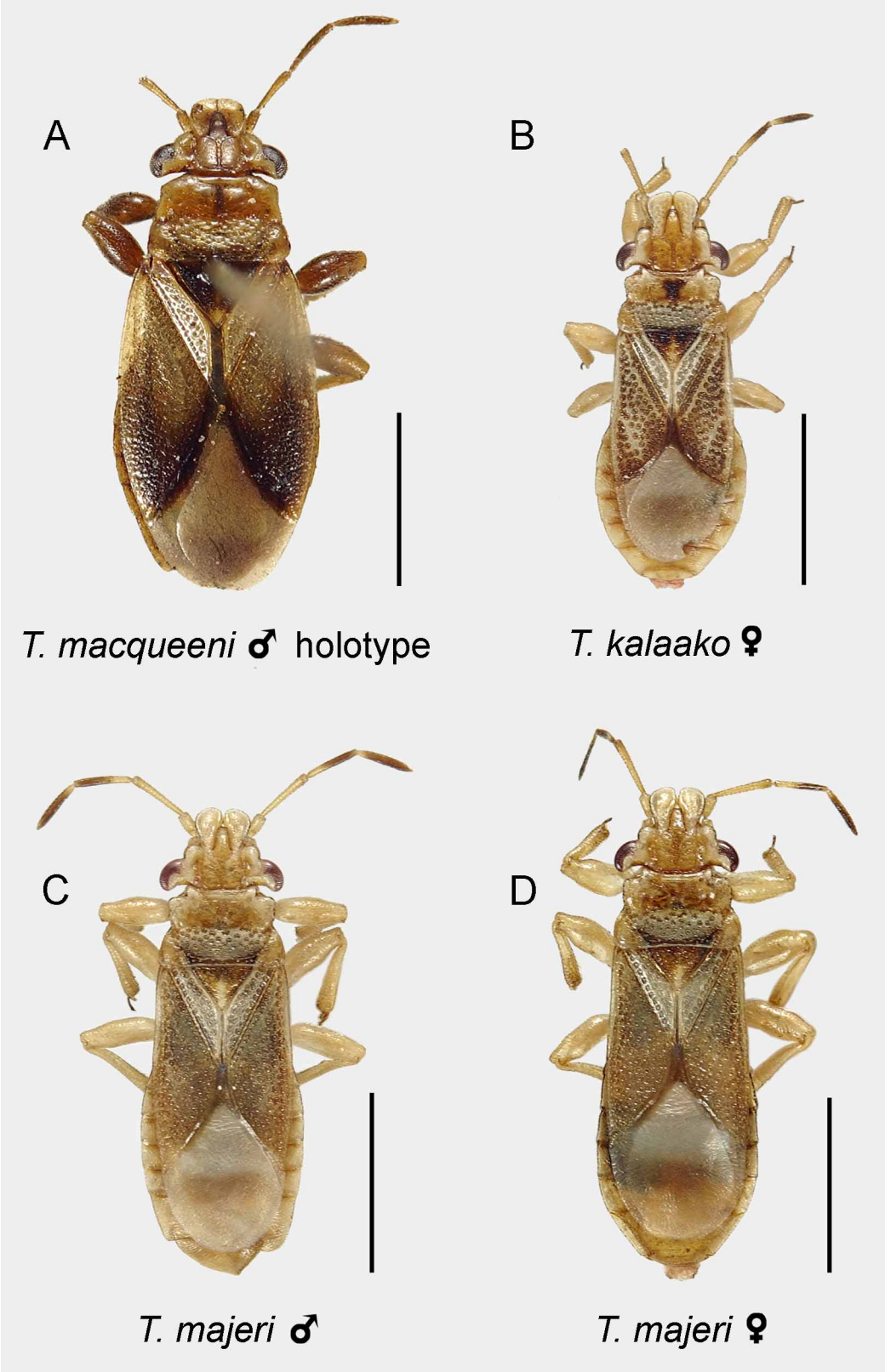

FIGURE 5. Habitus, dorsal view. **A** *Thaumastocoris macqueeni*. **B** *Thaumastocoris kalaako*. **C** and **D** *Thaumastocoris majeri*. Scale bar = 1mm.

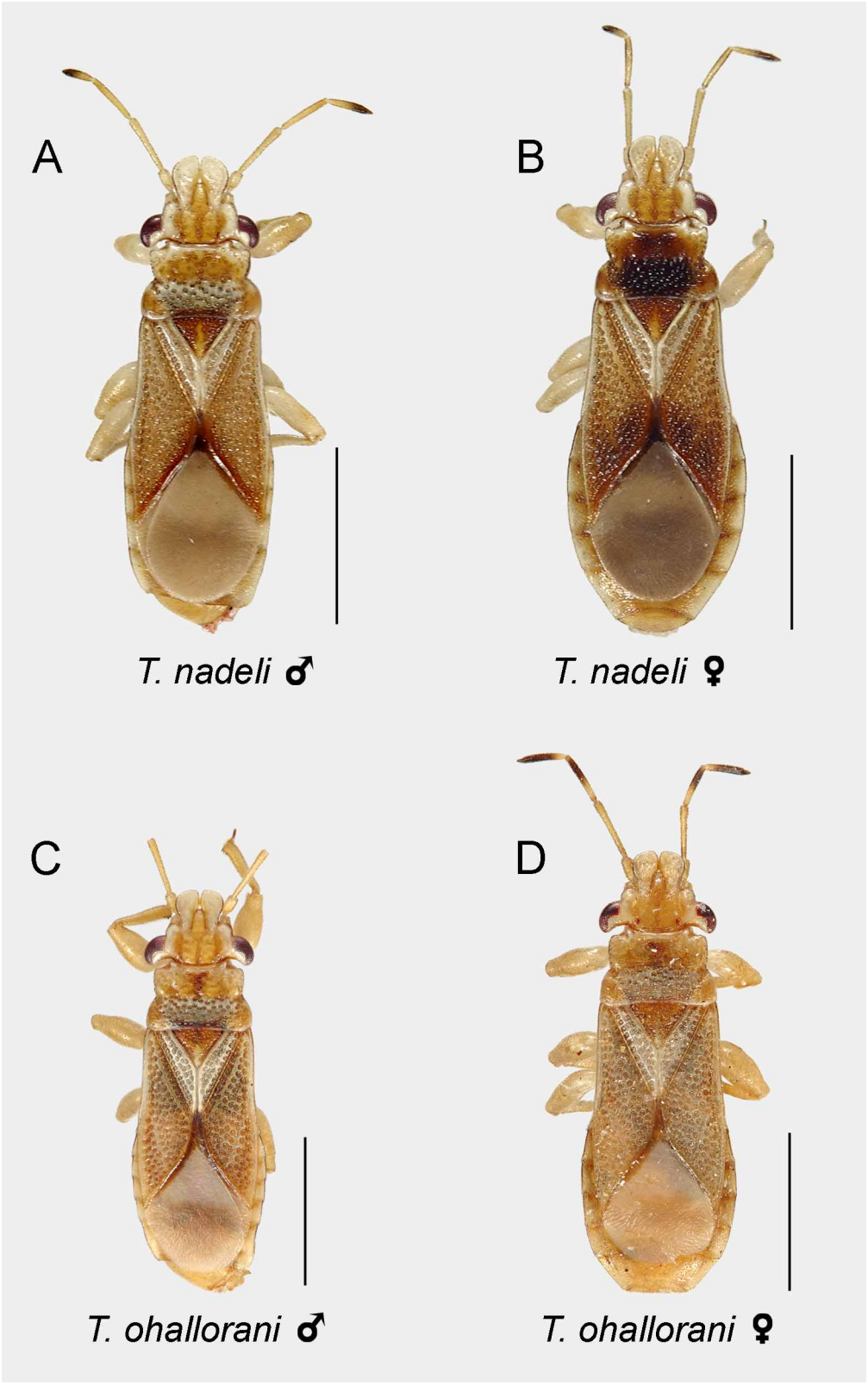

FIGURE 6. Habitus, dorsal view. **A** and **B** *Thaumastocoris nadeli*. **C** and **D** *Thaumastocoris ohallorani*. Scale bar = 1mm.

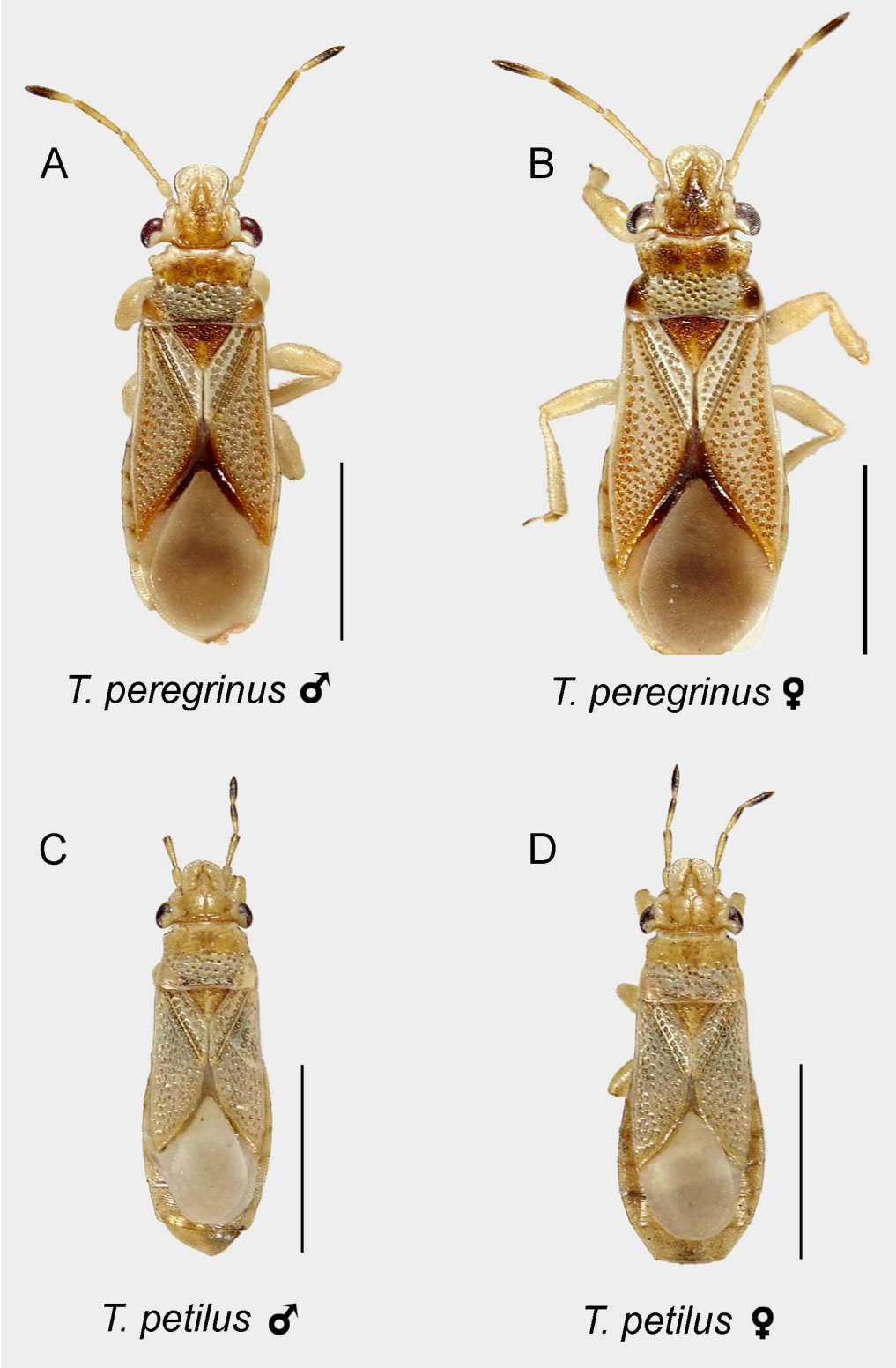

FIGURE 7. Habitus, dorsal view. **A** and **B** *Thaumastocoris peregrinus*. **C** and **D** *Thaumastocoris petilus*. Scale bar = 1mm.

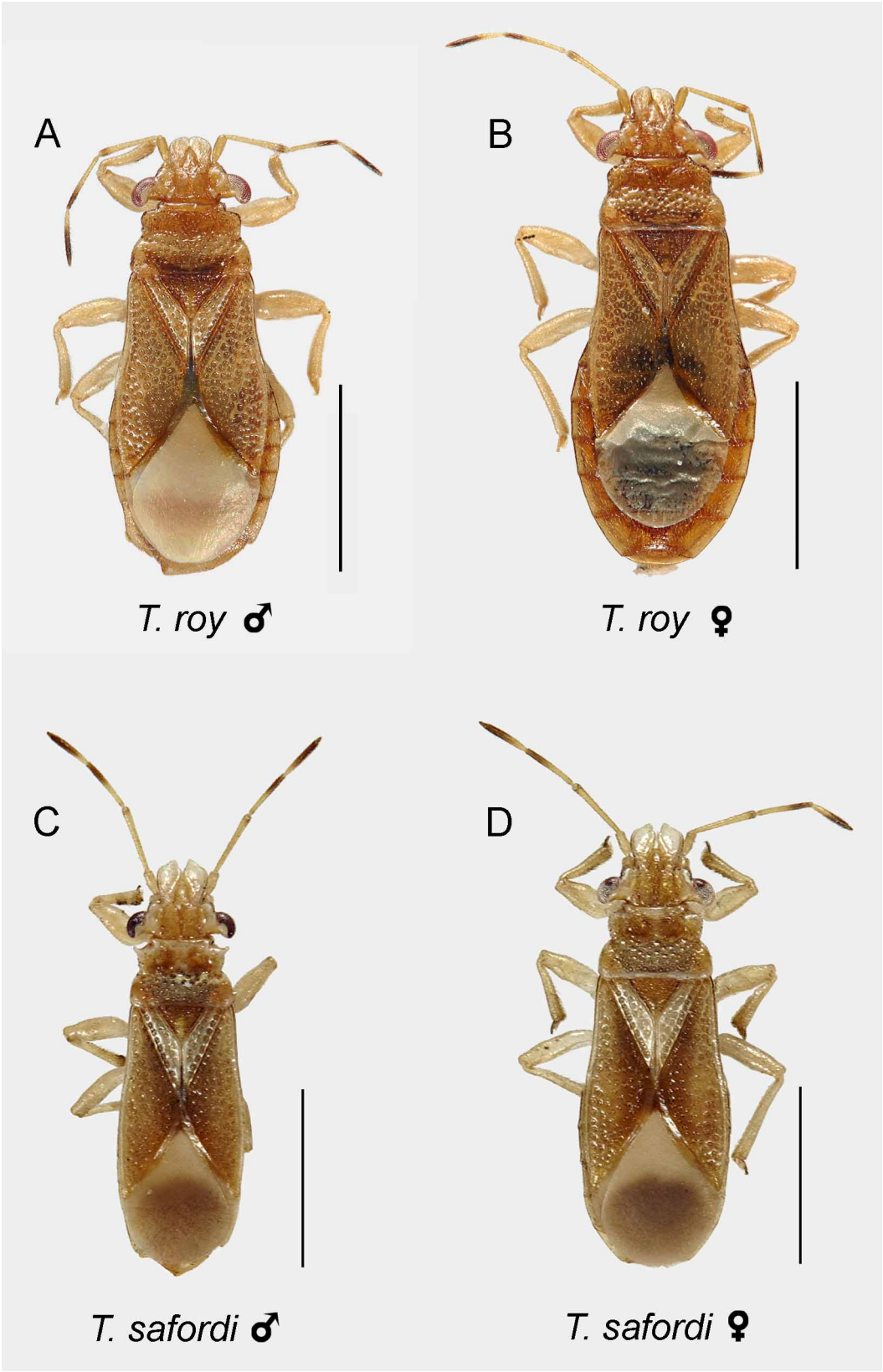

FIGURE 8. Habitus, dorsal view. **A** and **B** *Thaumastocoris roy.* **C** and **D** *Thaumastocoris safordi*. Scale bar = 1mm.

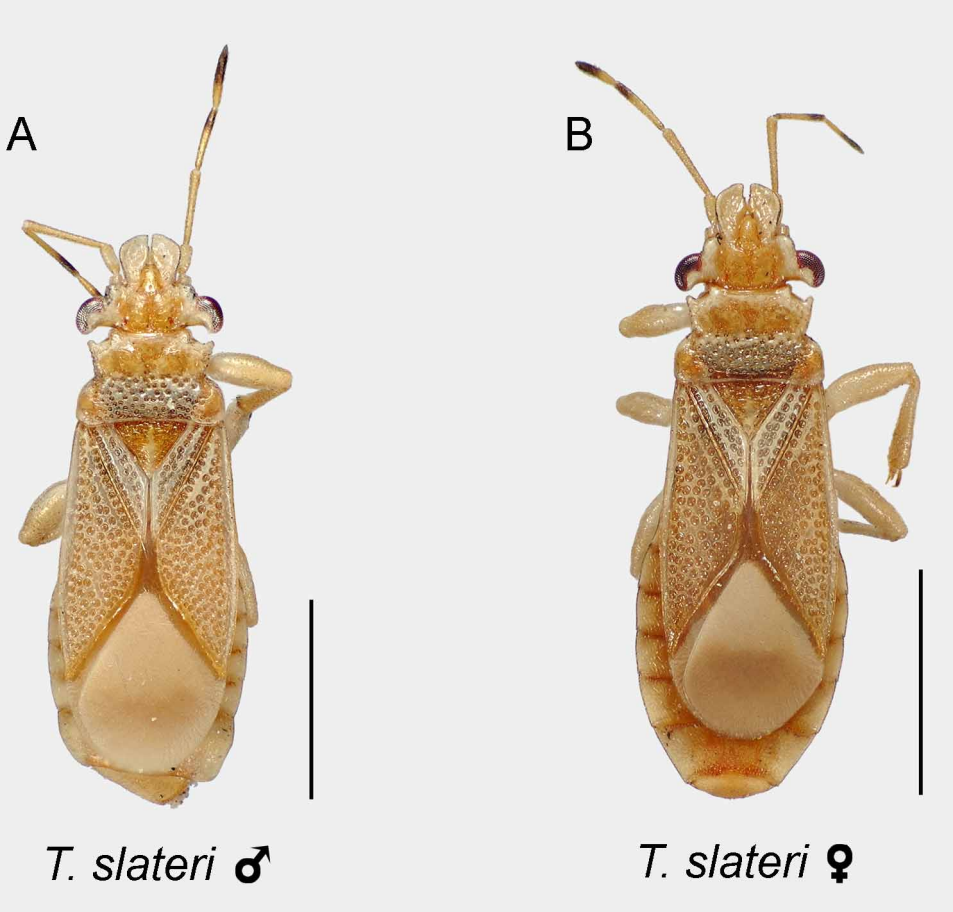

FIGURE 9. Habitus, dorsal view. **A** and **B** *Thaumastocoris slateri*. Scale bar = 1mm.

Checklist of species of *Thaumastocoris*

T. australicus Kirkaldy, 1908	QLD, NSW
T. busso new species	WA
T. freomooreae new species	VIC, SA, WA
T. hackeri Drake & Slater, 1957	QLD, NSW
T. kalaako new species	WA
T. macqueeni Rose, 1965	QLD
T. majeri new species	WA
T. nadeli new species	WA
T. ohallorani new species	SA
T. peregrinus Carpintero & Dellapé, 2006	NSW, QLD, SA, introduced to Argentina,Uruguay, Chile, Brazil, South Africa, Zimbabwe
T. petilus Drake & Slater, 1957	VIC, SA, NT, WA
T. roy new species	QLD
T. safordi new species	QLD, NSW
T. slateri new species	QLD

Key to species of *Thaumastocoris*

1 Forecoxae inserted at a distance less than coxal width (Figure 15B); pronotum weakly constricted medially (Figure 15D); pronotal disc broader than callosite region (Fig 15D) 2

\- Forecoxae inserted at distance equal to or more than coxal width (Figure 10B; 11B; 12B; 13B; 17B); pronotum weakly to

strongly constricted medially (Figure 10D; 11A; 12D; 13A; 14D; 16E; 17D); pronotal disc equal to or broader than callosite region (Figure 10D; 11A; 12D; 13A;14D;16E;17D) 3

2 Labium short, reaching anterior margin of prosternum (Figure 15B); eyes weakly pedicellate (Figure 7C,D; 15A,D); forecoxae subcontiguous (Figure 15B); prosternum bipartite (Figure 15B).. . . . . *T. petilus*

- Labium long, reaching submarginal posterior prosternum; eyes strongly pedicellate (Figure 4C,D; 8A,B); forecoxae separated by more than half coxal width; prosternum undivided 4

3 Pronotum with distinctive tubercle on anterolateral margin of callosite region (Figure 8C,D; 9A,B; 16E; 17D) 5

- Pronotum tuberculate (Figure 10D; 13A; 14D) to rounded (Figure 11A; 12D) but never with distinctive tubercle on anterolateral margin of callosite region. 6

4 Small species, males 2.37–2.41 mm, females 2.57–2.69 mm; antennae mostly light brown; AII with subapical dark annulations; subapical third AIII and apical two-thirds AIV dark brown to fuscous (Figure 8A,B); abdominal venter dark brown; paramere with broad medial keel (Figure 19D) . . . . . *T. roy*

- Large species, males 2.96–3.24 mm, females 3.24–3.36 mm; antennae mostly straw-coloured; apical half of AIII and all but sub basal ring of AIV dark brown to fuscous (Figure 4C,D); abdominal venter yellowish brown; paramere with apical hornlike projection (Figure 18E,F) . . . . . *T. hackeri*

5 Small species, males 2.41–2.65 mm, females 2.41–2.69 mm; abdomen narrow, lateral margins subparallel, barely visible from above (Figure 8C,D); pygophoral lock short, invaginated basally, strongly concave apically (Figure 16G; 19E) . . . . *T. safordi*

- Large species, males 3.08–3.20 mm, females 2.96–3.16 mm; abdomen expanded laterally, distinctly evident from above (Figure 9A,B); pygophoral lock elongated, weakly concave apically (Figure 17G; 19F) . . . . . *T. slateri*

6 Distinctive tubercle posteroventrally on propleuron (Figure 10B,E); abdominal venter strongly expanded (Figure 3C,D); pronotum strongly constricted medially (Figure 3C,D; 10D) . . . . . *T. busso*

- Posteroventral angle of propleura without tubercle (Figure 11B; 12B; 13B); abdominal venter either expanded or narrow; pronotum weakly to strongly constricted medially (Figure 11A; 13A) 7

7 Mandibular plates strongly recurved laterally (Figure 6A,B; 7A,B; 13A; 14A); bucculae strongly explanate, margins thickened, reniform posteriorly (Figure 13B; 14B) 8

- Mandibular plates weakly to strongly recurved (Figure 11A; 12A); bucculae margin thin to weakly explanate, not thickened or reniform posteriorly (Figure 11B; 12B) 9

8 Apex of pygophoral lock acute (Figure 19A); AIII yellowish brown (Figure 6A,B); female pronotal disc fuscous (Figure 6B), sexually dimorphic . . . . . *T. nadeli*

- Apex of pygophoral blunt (Figure 19B); AIII subapically light brown; (Figure 7A,B); female pronotal disc cream-coloured (Figure 7B), male concolorous (Figure 6A) . . . . . *T. peregrinus*

9 Labium elongate, reaching just beyond midpoint of forecoxae; medial margin of corium convex; apex of corium at membrane blunt, medial margin more than 45° to costal margin (Figure 5A; 5B) 10

- Labium short to moderately long, not reaching beyond midpoint of forecoxae (Figure 11B; 12B); medial margin of corium straight to excavate (Figure 11F); apex of corium at membrane weakly to strongly narrowed, never blunt medial margin less than 45° to costal margin (Figure 3A,B; 5C,D; 6C,D) 11

10 Body elongate, costal margins subparallel; dorsum yellowish brown; hemelytra extending to T8; eyes strongly pedicellate; abdomen strongly expanded laterally, visible beyond costal margins from above (Figure 5B) . . . . . *T. kalaako*

- Body ovoid; dorsum dark brown; hemelytra covering abdomen; eyes moderately pedicellate; abdomen not expanded laterally, barely visible beyond costal margins from above (Figure 5A). . . . . *T. macqueeni*

11 Labium very short, not reaching beyond anterior margin of prosternum; prosternum distinctly swollen, truncate anteriomedially. . . . . *T. australicus*

- Labium reaching beyond anterior margin of prosternum (Figure 11B; 12B); prosternum flat to weakly swollen, not distinctly swollen 12

12 Prosternum weakly swollen anteriorly (Figure 12B); pygophoral lock elongate, weakly concave medially, with a subapical notch; paramere securiform, elongate, weakly spatulate distally (Figure 18D) . . . . . *T. majeri*

- Prosternum weakly excavate anteriorly (Figure 11B); pygophoral lock weakly trapezoidal (Figure 18C,G,H), apices variously expanded or pointed, without notches (Figure 18D); paramere subrectangular or elongate, recurved or distinctly spatulate apically (Figure 18C,G,H) 13

13 Dorsum yellowish brown with contrasting dark brown to fuscous markings (Figure 6C,D); labium not reaching anterior margin of forecoxae; pygophoral lock trapezoidal, apices flared and rounded; paramere elongate, spatulate apically (Figure 18G,H) . . . . . *T. ohallorani*

- Dorsum light golden to yellowish brown with contrasting cream to light brown markings (Figure 4A,B); labium reaching anterior margin of forecoxae (Figure 11B); pygophoral lock moderately elongate, weakly trapezoidal, apices strongly flared, medial angles weakly pointed; paramere subrectangular, basal angle recurved (Figure 18C) . . . . . *T. freomooreae*

Thaumastocoris australicus Kirkaldy, 1908

(Figures: 3A,B; 18A)

Thaumastocoris australicus Kirkaldy 1908: 778; Drake and Slater 1957: 366 (description); Kumar 1964: 48 (morphology); Rose 1965: 141 (diagnosis); Slater 1973: 155 (taxonomy); Cassis and Gross 1995: 393 (catalogue); Cassis, Schuh and Brailovsky 1999: 28 (diagnosis; host plants); Carpintero and Dellapé 2006: 67 (diagnosis).

Neotype: ♂, QUEENSLAND, Mt. Coot-tha, 27-6-1927, H Hacker. '*Thaumastocoris australicus* Neotype Kirk,' 'NEOTYPE *Thaumastocoris australicus* Kirk. C.J. Drake, J.A. Slater' (USNM 63462 Type No.).

Other material examined. NEW SOUTH WALES: 1♀, 4.5 km S of Pottsville Beach, sea level, 28°25'52"S 153°33'27"E, 29 October 1998, RT Schuh, G Cassis, R Silveira, locality code NSW98-L01-H3, ex *Acacia saligna* (Labill.) H.L. Wendl. (Fabaceae: Mimosoideae) (NSW427618) (AM). QUEENSLAND, 1♂1♀, Brisbane 11.xi.1964, HA Rose (QM); 1♀, Brisbane, 8.vii.1962, K Barnard (QM); 1♀, Brisbane, 22.iv.1963, G Monteith (QM); 1♀, Brisbane, 5.x.1962, G Monteith (QM); 2♂, Carnarvon Range, Upper Bullaroo Creek, 3.vi.1954, TE Woodward, ex Wattle (QM); 1♂, Dalby 29.v.1964. J Wilson, ex sweeping (QM); 2♂, Mulgowie, ex *Eucalyptus maculate*, open forest, MD Peart, A487, 28.ix.1981 (QM); 4♂4♀, Saddletree Creek, via Maidenwell, SE Qld, A Postle, 12–14.iii.1976 (QM).

Diagnosis. *Thaumastocoris australicus* is recognised by the following characters: mandibular plates strongly flared laterally, eyes strongly pedicellate; labium very short, reaching anterior margin of prosternum; prosternum strongly swollen anteriorly; weak pronotal constriction, with disc wider than callosite region; abdomen expanded laterally, visible beyond costal margins of hemelytra (Figure 3A,B). It can be distinguished from *T. nadeli* and *T. peregrinus* by the strongly flared mandibular plates and weakly constricted pronotum. In particular, the pronotum of the last two species is strongly constricted (cf. Figure 6A,B; 7A,B). In addition, the prosternum in these species is flat and not swollen, as in *T. australicus* (cf. Figure 13B).

Redescription. Submacropterous. Male length 2.53–2.77, width 0.86–0.98; female length 2.61–2.92, width 1.91–1.11. Females slightly larger in size, with slightly more expanded abdomen. **Colouration**. Dorsum pale brownish yellow with contrasting dark brown to fuscous markings (Figure 3A,B). *Head*: mostly yellowish brown; vertex more yellow; lateral aspect of mandibular plates and genae cream. *Antennae*: mostly yellowish brown; subapical third of AIII and AIV dark brown. *Labium*: LI–LIII yellowish brown; apex of LIV light brown. *Pronotum*: mostly yellowish brown, disc paler than callosite region. *Thoracic sterna*: prosternum cream, mesosternum fuscous paler laterally. S*cutellum*: dark brown to fuscous anteriorly, paler posteriorly. *Hemelytra*: mostly yellowish brown, basal third of medial margin of endocorium dark brown; membrane sometimes with basal third and apical half dark brown, otherwise apically infused with light brown. *Legs*: mostly straw-coloured, second tarsomere dark brown. *Abdominal venter*: fuscous medially, yellowish brown laterally. **Texture**. Dorsum moderately polished, with scattered, shallow to deep, setose punctures. *Head*: vertex mostly impunctate, sometimes with transverse puncticulate rows visible; epicranial suture with irregular distribution of shallow punctures; mandibular plates irregularly punctate, denser posteriorly, punctures shallow. *Pronotum*: callosite region sparsely puncticulate, denser along midline and anterolateral angles; calli polished; disc densely and regularly punctuate, punctures moderately deep, posterolateral angles impunctate. *Thoracic pleura and sterna*: thoracic pleura with irregular shallow punctuation; propleuron with submarginal row of large, shallow punctures posteroventrally; thoracic sterna mostly with sparse, irregular punctuation; mesosternum strongly polished. *Scutellum*: densely and regularly punctate, punctures deep, midline polished posteriorly. *Hemelytra*: clavus with uniform distribution of deep punctures; corium with irregular distribution of deep punctures, punctures larger than on pronotal disc (Figure 3A,B). *Abdominal venter*: impunctate, moderately polished. **Vestiture**. Dorsum with uniform distribution of setose punctures, setae short, erect, straw-coloured; without other vestiture. Ventral surface with fine, straw-coloured, decumbent setae, most densely distributed on ventral aspect of mandibular plates, proepisternum, and medially proepimeron; thoracic sterna moderately polished. *Antennae*: with uniform distribution of decumbent setae, intermixed with fine, erect setae; AII–AIV with similar setae on lateral margins, otherwise bare. *Male genitalia*: pygophore with irregular distribution of fine seta; pygophoral lock with irregular distribution of setae, more sparse basally, margins bare; paramere evenly beset with fine setae (Figure 18A). **Structure.** *Head*: mandibular plates elongate, surpassing clypeus by less than clypeal length, contiguous medially, flared anteriorly, concave dorsally, lateral margins strongly flared, moderately recurved; bucculae strongly arcuate; gula distinctly concave. *Eyes*: moderately pedicellate. *Antennae*: AI and AIII cylindrical; AII slightly expanded distally; AIV weakly lanceolate. *Labium*: very short, just reaching anterior margin of prosternum. *Pronotum*: weakly constricted medially; callosite region and disc subequal in length, disc distinctly broader; callosite region weakly depressed along midline; anterolateral angles weakly tuberculate to rounded; lateral margin of disc weakly arcuate (Figure 3A,B). *Thoracic sterna*: prosternum distinctly swollen and truncate anteromedially; posterolateral margins of prosternum weakly flared. *Hemelytra*: at rest extending to caudal half of pygophore; medial margin of corium straight to weakly convex; apex of corium at membrane moderately narrowed, medial margin less than 45° to costal margin. *Legs*: forecoxae subequal to slightly wider than coxal

width; fore and mesofemora incrassate; fossula spongiosa elongate, reaching distal margin of second tarsomere; 6–7 fore and mesotibial teeth, 3–4 metatibial teeth. *Male Genitalia*: pygophoral lock flat and broad basally, weakly concave medially, weakly arcuate apically; paramere ovoid (Figure 18A).

Measurements. See Table 2.

Distribution. *Thaumastocoris australicus* is known from southeast Queensland and north eastern New South Wales (Figure 20A).

Host plant. *Thaumastocoris australicus* has been collected from three species of *Acacia* and a single species of *Eucalyptus* (Table 3).

Remarks. *Thaumastocoris australicus* was described by Kirkaldy (1908) from a single carded specimen collected from Bundaberg, Queensland. He erected the subfamily Thaumastocorinae to accommodate it, within the family Lygaeidae. Reuter (1912) elevated the subfamily to family status. Kirkaldy first named the genus as *Thaumastotherium*, but in the same publication, as *Thaumastocoris* in the legend for the plate of illustrations, and in a corrigenda page. Drake and Slater (1957) clarified the name as *Thaumastocoris* by page priority (Article 19, Copenhagen Decisions on Zoological Nomenclature). They also erected a neotype on the suspicion that the holotype had been lost during illustration (Drake and Slater 1957).

This species has been collected from south east Queensland and northern New South Wales. It has been collected on *Acacia* species. Cassis *et al.* (1999) expanded the host range of this thaumastocorid species to include *Eucalyptus* species, from collections made in central south east Queensland and South Australia, although questioning the conspecifity of these bugs. We have not been able to locate the Queensland specimens collected on *E. populnea populnea* to confirm their identity as *T. australicus*. However, the South Australian specimens from *E. costata* and *E. porosa* were misidentified as *T. australicus* by Cassis *et al.* (1999); in this work they represent two new species, *T. freomooreae* and *T. ohallorani*, respectively. Cassis *et al* (1999) excluded a number specimens collected from New South Wales, Victoria, and Western Australia from their consideration of *T. australicus*, stating that this material, although very similar to *T. australicus*, probably represented new *Thaumastocoris* species. In total, four new species was represented in the material identified as *T. australicus* by Cassis *et al*. (1999). Kumar (1964) successfully raised *T. australicus* on *Acacia cunninghami* in the laboratory and investigated their internal morphology. Unique to *T. australicus* is a very short labium which abuts the swollen truncate anterior margin of the prosternum.

Thaumastocoris busso Noack, Cassis & Rose n.sp.

(Figures: 3C,D; 10A–H; 18B)

Etymology. The specific name is a noun in apposition, as a local diminutive for Busselton (Western Australia), a regional centre near Leeuwin Naturaliste National Park, where the species was collected.

Holotype: ♂, WESTERN AUSTRALIA: Point Road Campground, Leeuwin Naturaliste National Park, 34.09361S 115.01638E, 50 m, 2 December 1998, G Cassis locality code WA98-L13-H33 (WAM). Paratypes: 1♂, 2♀, same data as holotype (AM; UNSW).

Diagnosis. *Thaumastocoris busso* is recognised by the following combination of characters: body elongate; eyes pedicellate; pronotum strongly constricted medially; propleuron with large tubercle posteroventrally; abdomen strongly expanded laterally. It is distinguished by the prominent tubercle on the posteroventral angle of the propleuron. This species has a strongly expanded abdomen which is visible beyond the costal margins of the hemelytra in a dorsal view. Other *Thaumastocoris* species with expanded abdomens (*T. freomooreae, T. kalaako,* and *T. hackeri*) do not have a prominent propleural tubercle.

Description. Submacropterous. Males, length 2.61–3.08, width 1.05–1.05; females, length 2.95–2.95, width 0.96–1.06. Female slightly larger in size, with abdomen more expanded laterally. **Colouration**. Dorsum yellowish brown with contrasting dark brown to fuscous markings (Figure 3C,D). *Head*: mostly yellowish brown; vertex medium brown; lateral margins of clypeus and mandibular plates dark brown to fuscous; genae with fuscous stripe laterally; gula and bucculae straw-coloured. *Antennae*: mostly yellowish brown with dark markings; AII with subapical dark brown annulations; subapical third AIII dark brown; apical two-thirds of AIV dark brown to fuscous. *Labium*: LI–LIII straw-coloured; apex of LIV fuscous. *Pronotum*: mostly yellowish brown, pronotal disc cream-coloured medially (Figure 3C,D). *Thoracic pleura and sterna*: mostly yellowish brown, propleura cream ventrally,

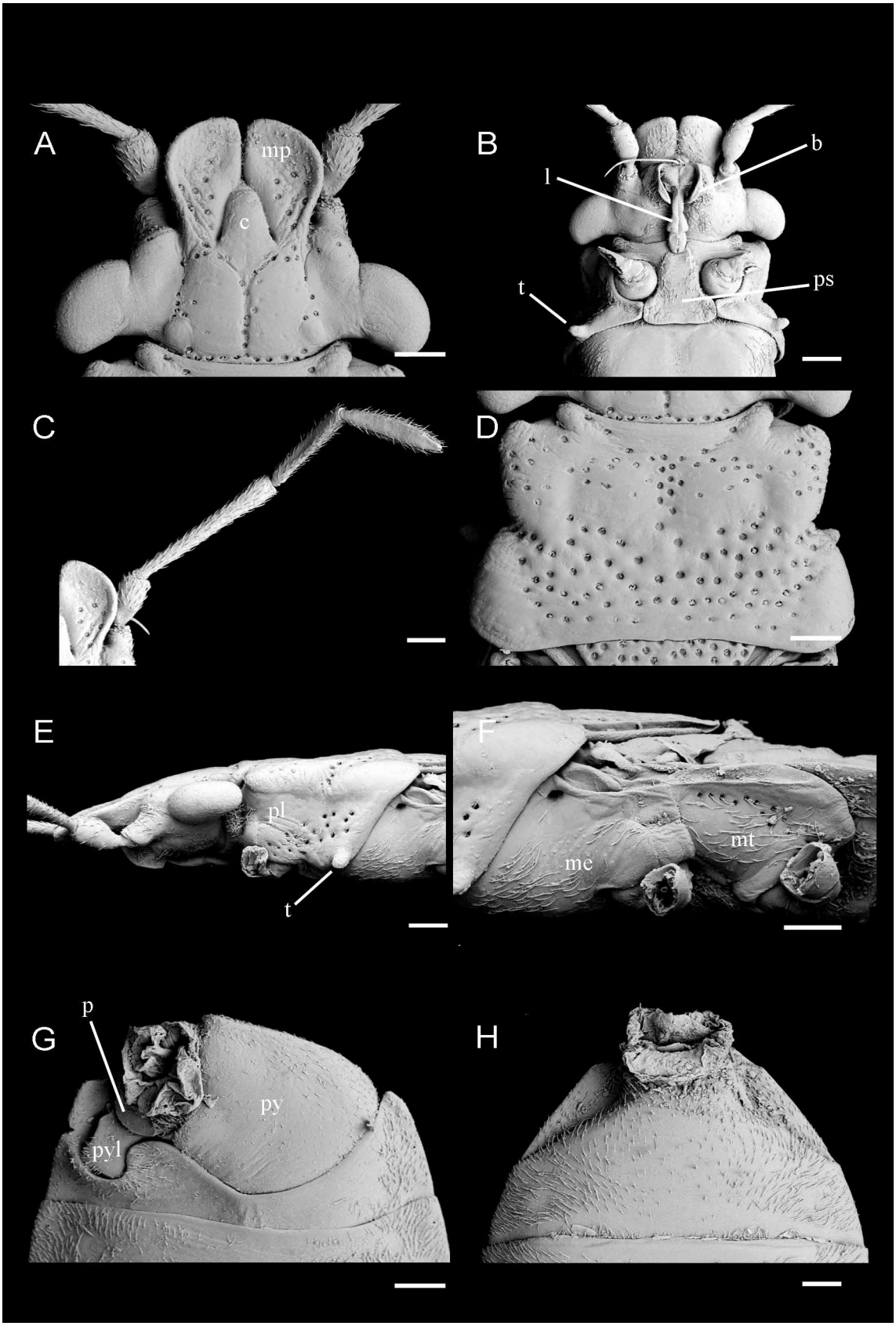

FIGURE 10. Scanning electron micrographs: *Thaumastocoris busso*. **A** ♂ head, dorsal view. **B** ♂ head and prosternum, ventral view. **C** ♂ antenna, dorsal view. **D** ♂ pronotum, dorsal view. **E** ♂ head and propleura, lateral view. **F** ♂ thorax, lateral view. **G** ♂ genitalia, ventral view. **H** ♀ genitalia, ventral view. b = bucculae, c = clypeus, I = labium, me = mesopleuron, mp =mandibular plate, mt = metapleuron, p = paramere, pI = propleuron, ps = prosterna, py =pygophore, pyl = pygophoral lock, t = tubercle. Scale bar = 0.1mm.

dark brown medially, darkening to fuscous stripe at dorsal margin; prosternum straw-coloured. *Scutellum*: dark brown anteriorly, paler posteriorly, posterior half of midline straw-coloured. *Hemelytra*: yellowish brown, with clavus more cream-coloured (Figure 3C,D); membrane cream, medially infused with brown. *Legs*: mostly straw-coloured, distal half of second tarsomere dark brown. *Abdomen*: uniformly yellowish brown. **Texture**. Dorsum moderately polished, with scattered shallow to deep setose punctures (Figure 3C,D; 10D). *Head*: vertex mostly impunctate, sometimes with transverse puncticulate rows visible; epicranial suture with irregular distribution of moderately deep punctures; mandibular plates irregularly punctate, denser and deeper posteriorly (Figure 10A). *Pronotum*: callosite region irregular distribution of shallow punctures, denser along midline and anterolateral angles; disc dense and uniform distribution of deep punctures, posterolateral angles impunctate (Figure 10D). *Thoracic pleura and sterna*: propleura with submarginal patch of deep punctures anterior to propleural tubercle (Figure 10E); metapleural suture marked by single row of fine punctures (Figure 10F); thoracic sterna mostly with irregular fine punctuation, mesosternum strongly polished. *Scutellum*: dense and uniform distribution of deep punctures deep, midline polished posteriorly. *Hemelytra*: clavus and corium with uniform distribution of deep punctures, as on pronotal disc. *Abdomen*: impunctate, moderately polished. **Vestiture**. Dorsum with uniform distribution of setose punctures, setae short, erect, straw-coloured; lateral and ventral aspects of body with fine, straw-coloured, decumbent setae, most densely distributed on ventral margin of mesopleural (Figure 10F), ventral aspect of mandibular plates, gula and prosternum (Figure 10B); mesosternum with finer, shorter setae. *Antennae*: uniform distribution of decumbent setae, intermixed with fine erect setae, AIII–AIV with Same setae on lateral margins, otherwise bare (Figure 10C). *Male genitalia*: pygophore clothed in fine seta, denser near genital opening; pygophoral lock with irregular distribution of setae, becoming sparse basally, lateral margin with thick, stout setae; paramere evenly beset with dense setae, elongate medially, becoming sparse apically (Figure 18B). **Structure.** *Head*: mandibular plates elongate, surpassing clypeus by length of clypeus, contiguous medially, flared anteriorly, concave dorsally, lateral margins strongly recurved (Figure 3C,D; 10A); bucculae moderately arcuate, explanate posteriorly (Figure 10B). *Eyes*: moderately pedicellate (Figure 10A,B). *Antennae*: AI and AII cylindrical; AII and AIII slightly expanded distally; AIII and AIV dorsoventrally flattened; AIV weakly lanceolate (Figure 10C). *Labium*: short, surpassing anterior margin of prosternum (Figure 10B). *Pronotum*: strongly constricted medially; callosite region and disc subequal in length, disc broader; callosite region depressed along midline; anterolateral angles moderately tuberculate; lateral margin of disc weakly arcuate (Figure 3C,D; 10D). *Thoracic pleura and sterna*: propleura with large tubercle posteroventrally; prosternum flat to weakly concave medially (Figure 10B,E). *Hemelytra*: at rest extending to abdominal TIX; medial margin of corium excavate distally; apex of corium at membrane narrowed, inner margin less than 45° to costal margin (Figure 3C,D). *Abdomen*: strongly expanded laterally, visible beyond costal margins in dorsal view. *Legs*: forecoxae separation subequal to slightly wider than coxal width (Figure 10B); fore and mesofemora strongly incrassate; fossula spongiosa elongate, reaching distal margin of second tarsomere; 4–7 foretibial teeth, 5–7 mesotibial teeth, 0–3 metatibial teeth. *Male Genitalia*: pygophoral lock narrowed basally, subrectangular apically with basal angle recurved, other angles rounded; paramere subquadrangular (Figure 18B).

Measurements. See Table 2.

Distribution. *Thaumastocoris busso* is known only from the type locality (Figure 20A).

Host plant. Unknown

Remarks. *Thaumastocoris busso* is one of the largest species of the genus described to date. It is easily recognised by the prominent tubercle on its propleuron, which is unique to this species.

Thaumastocoris freomooreae Noack, Cassis & Rose n.sp.

(Figures: 4A,B; 11A–H; 18C)

Etymology. Named in honour of Jennifer Moore for her substantial support in field and laboratory investigations of *Thaumastocoris* species. The suffix, freo, reflects her passion for the Fremantle Football Club.

Holotype: ♂, VICTORIA: 27 km W of Hattah, Murray Sunset National Park, -34.73835 142.01, 45 m, 3 November 2002, RT Schuh, G Cassis, MD Schwartz and R Silveira, locality code TAS02-L5-H11, ex *Eucalyptus costata* Behr and Muell. ex F. Muell. Royal Bot. Gard., (NSW staff NSW658091) (AM). Paratypes: 5♂, 5♀ same data as holotype (AM; UNSW). SOUTH AUSTRALIA: 1♀, 1 nymph, Billiatt Conservation Park, 32 km S Ala-

woona, 34°59’29”S 140°28’22”E, 27–28 March 2000, ex pitfall traps, JA Forrest (SAMA); 1♂, Monarto, approx 4 km E Callington, 35°07’S 139°05’E, 16 November 1984, ex *Eucalyptus porosa* woods and forests (SAMA); 2♂, 3♀, 1 nymph, Ngarkat Conservation Park, 8 km S of Bews, 60 m, 35°33’07”S 140°25’59”E, 9 November 1998, RT Schuh, G Cassis and R Silveira, locality code 98-L36H76, ex *Eucalyptus calycogona* Turcz. (NSW427496) (AM); Ngarkat Conservation Park, border track SSE Pinnaroo 30 Mar 2000, vehicle net, J.A. Forrest 1♀ (SAMA); 3♂, 5♀, 1 nymph, Scorpion Springs Conservation Park. 35°29’14”S 140°51’58”E, 120 m, 10 November 1998 RT Schuh, G Cassis and R Silveira, locality code L42 H90, ex *Eucalyptus costata* (AM; UNSW). VICTORIA: 2♀, Murray Sunset National Park, Lost Hope Track, 34.79166S 141.8357E, 55 m, November 4 2002, G Cassis, RT Schuh, MD Schwartz and R Silveira, locality code TAS02-L7-H18, ex *Eucalyptus leptophylla* F.Muell. (NSW staff NSW6580980) (AM); 1♂, 1♀, 1 nymph, 27 km W of Hattah, Murray Sunset National Park, 34.73835S 142.01E, 35 m, November 3 2002, RT Schuh, G Cassis, MD Schwartz and R Silveira, locality code TAS02-L5-H11, ex *Eucalyptus costata* Behr and Muell. ex F. Muell. Royal Bot. Gard. (NSW staff NSW658091) (AM); 2♂, 3♀, 13 km S of Kaniva 36.50001S 141.2167E, 150 m, 3 November 1995 RT Schuh and G Cassis, locality code NSW95-L49-H81, ex *Eucalyptus costata murrayana* Behr. and Muell. Ex F. Muell. Royal Bot. Gard., K.D. Hill 1996 NSW395980 (AM; UNSW). WESTERN AUSTRALIA: 2♂, 2♀, 23 km ESE of Cocklebiddy 32°08’S 126°18’E 12 October 1981, ID Naumann and JC Cardale (ANIC); 2♂, 1♀, Highbury, 33°00.811’S 117°14.577’E, 323 m, 1 July 2008, ML Moir, ex *Eucalyptus longicornis* (MMPC); 1♂, 2♀, 1 nymph, Highbury, 33°00.828S 117°13.838E, 329 m, 2 July 2008, ML Moir, ex *Eucalyptus sideroxylon* (MMPC); 4♂, 9♀, 3 nymphs, Highbury, 33°00.828’S 117°13.838’E, 329 m, 1 July 2008, ML Moir, ex *Eucalyptus wandoo* (MMPC); 2♀, 1 nymph, Highbury, 33°00.811’S; 117°14.577’E, 323 m, 1 July 2008, ML Moir, ex *Eucalyptus astringens* (MMPC); 1♂ Swan River, AM Lea (WAAD); 1♂, 4♀, Westonia 16 April 2003, JD Majer, chemical knockdown, ex *Eucalyptus salubris* (MMPC); 1♂, Westonia 16 April 2003, JD Majer, chemical knockdown, ex *Eucalyptus woodwardi* (MMPC); 1♀, Westonia 16 April 2003, JD Majer, chemical knockdown, ex *Eucalyptus sargentii* (MMPC).

Diagnosis. *Thaumastocoris freomooreae* is recognised by the following combination of characters: body narrow, costal margins subparallel (Figure 4A,B); mandibular plates gently and evenly rounded (Figure 11A); labium moderately long (Figure 11B); pronotal constriction weak, with truncate to rounded anterolateral angles (Figure 4A,B; 11A); pygophoral lock weakly trapezoidal; paramere subrectangular, apically recurved. (Figure 18C). This species is distinguished from *T. majeri* and *T. ohallorani* by its longer labium. The labium of *T. freomooreae* reaches the anterior margin of the forecoxae, whereas the labium of *T. majeri* and *T. ohallorani* is shorter, just extending past the anterior margin of the prosternum in both the last two species. In addition, the paramere of *T. freomooreae* is recurved apically, whereas the paramere of both *T. majeri* and *T. ohallorani* is spatulate apically (cf. Figure 18D,G,H).

Description. Submacropterous. Male length 2.45–3.00, width 0.62–0.93; female length 2.77–3.12, width 1.01–1.17. Females larger in size, abdomen greatly expanded beyond costal margins. **Colouration**. Dorsum yellowish brown with contrasting dark brown to fuscous markings (Figure 4A,B). *Head*: mostly yellowish brown; vertex golden yellow to medium brown; lateral aspects of mandibular plates and genae with fuscous stripe; genae, gula and bucculae straw-coloured. *Antennae*: mostly yellowish brown; subapical half to two-thirds of AIII and apical two-thirds of AIV dark brown to fuscous; female AIII and AIV sometimes less darker. *Labium*: LI–LIII straw-coloured; apex LIV fuscous. *Pronotum*: mostly yellowish brown; pronotal disc cream-coloured medially (Figure 4A,B). *Thoracic pleura and sterna*: mostly yellowish brown; prosternum fuscous, paler at anterior margin; mesosternum fuscous medially becoming paler laterally. *Scutellum*: dark brown anteriorly, posterolateral margins paler, posterior half of midline straw-coloured. *Hemelytra*: yellowish brown, with clavus more cream-coloured; membrane cream, medially infused with brown (Figure 4A,B). *Legs*: mostly straw-coloured, with distal half of second tarsomere dark brown. *Abdomen*: uniformly yellowish brown. **Texture**. Dorsum moderately polished, with scattered shallow to deep setose punctures. *Head*: vertex mostly impunctate, with transverse puncticulate rows; epicranial suture with irregular distribution of moderately deep punctures; mandibular plates irregularly punctate, denser posteriorly, punctures shallow (Figure 11A). *Pronotum:* callosite region sparsely punctate, punctures shallow, denser along midline and at anterolateral angles; disc densely and regularly punctate, punctures deep, posterolateral angles impunctate (Figure 11A). *Thoracic pleura and sterna*: proepimeron finely punctate posteriorly; metapleuron with irregular distribution of fine punctures posteriorly (Figure 11E); thoracic sterna impunctate, mesosternum strongly polished medially. *Scutellum*: densely and regularly punctate, punctures deep, midline polished posteriorly. *Hemelytra*: clavus and corium with uniform distribution of deep punctures, larger than on pronotal disc (Figure 11F). *Abdomen*: impunctate moderately polished. **Vestiture**. Dorsum with uniform distribution of setose

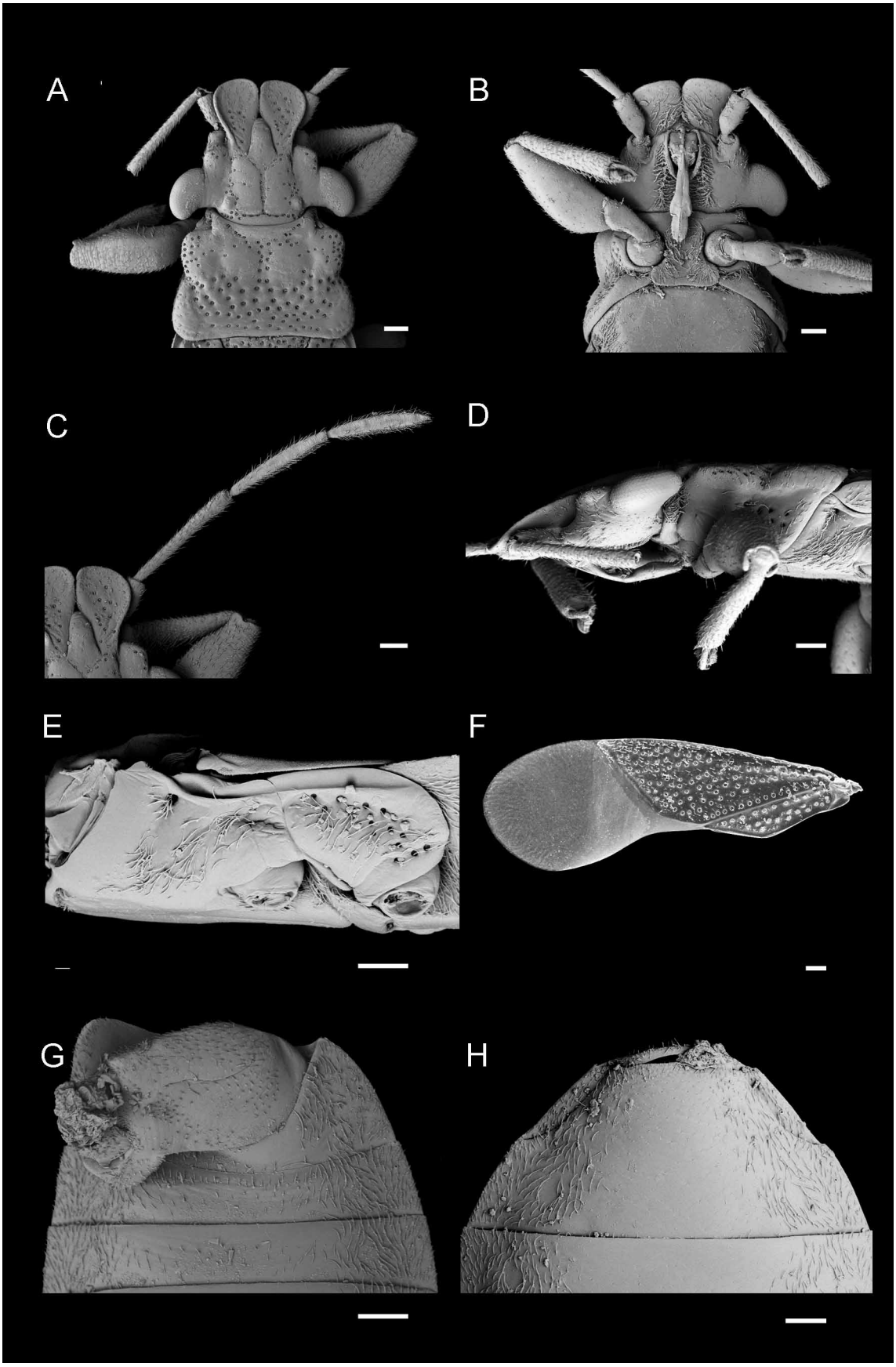

FIGURE 11. Scanning electron micrographs: *Thaumastocoris freomooreae*. **A** ♂ head and pronotum, dorsal view. **B** ♂ head and prosternum, ventral view. **C** ♂ antenna, dorsal view. **D** ♂ head and propleura, lateral view. **E** ♂ thorax, lateral view. **F** ♂ hemelytra, dorsal view. **G** ♂ genitalia, ventral view. **H** ♀ genitalia, ventral view. Scale bar = 0.1mm.

punctures, setae, short, erect, straw-coloured. Ventral surface of body with fine, straw-coloured, decumbent setae, most densely distributed on ventral aspect of mandibular plates, gula, and prosternum (Figure 11B); mesosternum with irregular distribution of fine setae medially, sparse laterally. *Antennae*: uniform distribution of decumbent setae, intermixed with fine, erect setae; AIII and AIV with same setae on lateral margins, otherwise bare (Figure 11C). *Legs*: dorsal surface of femora and tibia with short, erect setae. *Male Genitalia*: pygophore with irregular distribution of fine setae; pygophoral lock irregularly setose medially, margins mostly bare; paramere evenly beset with setae medially, becoming sparse apically (Figure 18C). **Structure.** *Head*: mandibular plates elongate, surpassing clypeus by less than length of clypeus, contiguous medially, moderately flared anteriorly, concave dorsally, with lateral margins moderately recurved (Figure 4A,B; 11A); bucculae strongly arcuate, weakly explanate posteriorly (Figure 11B); genae swollen, truncate anteriorly; gula concave. *Eyes*: moderately pedicellate (Figure 4A,B: 11A). *Antennae*: AI cylindrical; AII slightly expanded distally; AIII and AIV dorsoventrally flattened; AIV weakly lanceolate (Figure 11C). *Labium*: moderately long, reaching beyond anterior margin of forecoxae (Figure 11B). *Pronotum*: weakly constricted medially; callosite region and disc subequal in length, disc a little broader; callosite region weakly depressed along midline; anterolateral angles rounded to weakly tuberculate; lateral margin of disc weakly arcuate (Figure 11A). *Thoracic sterna*: prosternum weakly concave medially (Figure 11B). *Hemelytra*: at rest extending to basal third of pygophore; medial margin of corium convex medially, weakly excavate distally; apex of corium at membrane narrowed, medial margin less than 45° to costal margin (Figure 4A,B). *Legs*: forecoxal separation equal to slightly wider than coxal width; fore and mesofemora strongly incrassate (Figure 11B); fossula spongiosa elongate, reaching distal third of second tarsomere (Figure 11B,D); 3–8 foretibial teeth, 0–6 mesotibial teeth, metatibiae bare. *Male Genitalia*: pygophoral lock moderately elongate, subtrapezoidal, with apical angle strongly flared, medial angles weakly pointed; paramere subrectangular, apical angle recurved (Figure 18C).

Measurements. See Table 2.

Distribution. *Thaumastocoris freomooreae* is distributed through southern Australia; collected from northwest Victoria (Figure 2B), south eastern South Australia, and Cocklebiddy on the southeast coast of Western Australia, and northeast of Perth, Western Australia (Figure 20A).

Host plants. This species is known from fifteen species of *Eucalyptus* (Table 3).

Remarks. *Thaumastocoris freomooreae* is known from drier environments. From one collecting event in Highbury, Western Australia, this species was taken in conjunction with *T. nadeli* on *Eucalyptus wandoo*. The specimens collected from the goldfields district in Western Australia (Westonia), are slightly smaller and paler than other populations of *T. freomooreae*.

Thaumastocoris hackeri Drake and Slater, 1957

(Figures: 4C,D; 18E,F)

Thaumastocoris hackeri Drake and Slater 1957: 367 (description); Rose 1965: 144 (diagnosis); Slater 1973: 155 (taxonomy); Cassis and Gross 1995: 393 (catalogue); Cassis, Schuh and Brailovsky 1999: 29 (diagnosis; host plants).

Holotype: ♂, QUEENSLAND, Bunya Mt. III-1931 H. Hacker. (USNM)

Other material examined. 1♂, NEW SOUTH WALES, Upper Williams River October 1926, AM Lea and FE Wilson, Paratype *Thaumastocoris hackeri* Drake and Slater (SAMA).; 1♀, Horton's Creek, near Clouds Creek, 28.viii.1961, CN and AS Smithers, K157186 (AM); 1♀ [K157190], 1♂ [K157191], approx. 3 km N Lansdowne via Taree, 2 November, 1990 G and T Williams, ex *Schizomeria ovata* blossoms (AM); 1♂ [K157192], approx. 3 km N Lansdowne via Taree, 6 November 1990, G and T Williams, ex *Schizomeria ovata* blossoms (AM). QUEENSLAND: 1♂, Brisbane, 1.xi.1964, HA Rose (QM); 1♂, Brisbane, 26.xi.1964, HA Rose (QM); 1♀, Brookfield, 1-xi-1926, H Hacker (QM); 1♂, Hidden Canyon, W slope Bluff Range, near Biggenden, 12 August 1975, H Frauca (ANIC); 1♂, Kuranda State Forest, 28.1 km N of Kuranda, 16°40'25"S 145°30'08"E, 28 April 1998, G Cassis, locality code Q98-L18-H17, Rubiaceae (Det. Royal Bot Gard. NSW) (AM); 1♂, Southport, 24-x-1926, H Hacker (QM).

Diagnosis. *Thaumastocoris hackeri* is recognised by the combination of the following characters: body elongate; eyes strongly pedicellate; mandibular plates weakly concave and moderately expanded laterally; labium elongate, reaching posterior region of prosternum; corium laterally expanded beyond claval commissure; abdomen

laterally expanded and visible dorsally visible beyond costal margin of hemelytra (Figure 4C,D); paramere elongated into a hornlike projection apically (Figure 18E,F). *Thaumastocoris hackeri* can be distinguished from *T. roy,* a species with a similar body shape and elongate labium, by the paramere (cf. Figure 19D). The paramere of *T. roy* forms a keel apically and is not hornlike. In addition, *T. hackeri* is much larger in size than *T. roy.*

Redescription. Submacropterous. Male length 2.96–3.24, width 0.98–1.23; female length 3.24–3.36, width 1.23–1.35. Females slightly larger in size and darker in colouration. **Colouration**. Dorsum straw-coloured to yellowish brown, with contrasting dark brown markings (Figure 4C,D). *Head*: mostly straw-coloured; sublateral margins darker; gula dark brown. *Antennae*: mostly straw-coloured; apical half of AIII and all excluding basal eight of AIV dark brown to fuscous. *Labium*: mostly yellowish brown; LIII and LIV darker brown. *Pronotum*: mostly yellowish brown; pronotal disc yellowish cream, medially with dark brown. *Thoracic pleura and sterna*: mostly yellowish brown, propleura yellowish brown paler dorsally; prosternum fuscous; mesosternum dark brown, paler laterally. *Scutellum*: straw-coloured, anterior margin yellowish brown. *Hemelytra*: mostly straw-coloured, medial margin of corium often darker; membrane straw-coloured, medially infused with dark brown (Figure 4C,D). *Legs*: mostly yellowish brown, second tarsomere light brown. *Abdomen*: uniformly yellowish brown. **Texture**. Dorsum moderately polished, with shallow to deeply set setose punctures. *Head*: irregularly punctuate; vertex mostly impunctate, with three transverse puncticulate rows, punctures shallow; epicranial suture with irregular distribution of fine punctures; mandibular plates with regular distribution of punctures, bare anteriorly. *Pronotum*: callosite region irregularly punctate, punctures shallow, midline with fine dense punctures, anterolateral angles with sparse shallow punctures; disc densely and regularly punctate, punctures deep, posterolateral angles impunctate. *Thoracic pleura and sterna*: pleura with uniform dense shallow punctures; mesosternum strongly polished medially. *Scutellum:* densely and regularly punctate, punctures deep, midline polished posteriorly. *Hemelytra*: clavus and corium with uniform moderate distribution of deep punctures, larger than on pronotal disc. *Abdomen*: impunctate, moderately polished. **Vestiture**. Dorsum with uniform distribution of setose punctures, setae short and straw-coloured. Lateral aspects of body uniformly clothed with short straw-coloured, erect setae. Ventral surface with short sparse setae, becoming bare medially. *Antennae*: AII–AIII with uniform distribution of fine, erect setae; AIV with same seta on lateral margins, sparse on dorsal and ventral surface. *Male genitalia*: pygophore clothed in fine setae; pygophoral lock with dense setae apically; paramere with setae medially, horn nude (Figure 18E,F). **Structure.** *Head*: mandibular plates elongate, surpassing clypeus by less than clypeal length, contiguous medially, weakly flared anteriorly, weakly concave dorsally, anterolateral margins weakly recurved; genae swollen; bucculae strongly arcuate; gula weakly concave. *Eyes*: strongly pedicellate, recurved (Figure 4C,D). *Antennae*: AI to AIII cylindrical; AIV weakly dorsoventrally flattened. *Labium*: elongate, reaching towards posterior margin of prosternum. *Pronotum*: weakly constricted medially; callosite region shorter than disc, disc broader; anterolateral angles weakly arcuate; lateral margin of disc weakly arcuate; disc slightly raised above callosite region (Figure 4C,D). *Thoracic sterna and pleura*: prosternum moderately expanded ventrally; propleura concave medially, posterolateral margins reduced. *Hemelytra*: at rest extending to abdominal TIX; corium expanded beyond claval commissure, medial margin of corium weakly excavate distally, apex of corium at membrane narrowed, medial margin more than 45° to costal margin (Figure 4C,D). *Legs*: forecoxal separation less than coxal width; fore and mesofemora strongly incrassate; fossula spongiosa elongate, reaching distal margin of second tarsomere; 15–20 foretibial teeth, 12–18 mesotibial teeth, 5–6 metatibial teeth. *Male Genitalia*: pygophoral lock elongated, expanded apically; paramere ovate with horn like projection apically (Figure 18E,F).

Measurements. See Table 2.

Distribution. This species is distributed from temperate to tropical eastern Australia (Figure 20A); from just north of Sydney to Kuranda.

Host plant. *Thaumastocoris hackeri* has been collected from a wide range of host plants, and among thaumastocorids shows some of the widest phylogenetic diversity in plant families (Table 3). It has been collected in Kuranda from an unidentified plant in the Rubiaceae. Near Landsdowne in New South Wales it was found on the blossoms of *Schizomeria ovata* (Cunoniaceae). Rose (1965) also collected it from *Elaeocarpus obovatus* (Elaeocarpaceae).

Remarks. The paramere of *Thaumastocoris hackeri* has an apical hornlike projection which is unique to this species and quite elaborate in comparison to other species of *Thaumastocoris*.

***Thaumastocoris kalaako* Noack, Cassis & Rose n.sp.**
(Figure: 5B)

Etymology. This species is named after the aboriginal language group, Kalaako, south of Kalgoorlie, Western Australia (Tindale 1974), where this species was collected.

Holotype: ♀, WESTERN AUSTRALIA: 49 km S of Kambalda Road, junction on Coolgardie-Esperance Highway; 300m, 31°43.025'S 121°41.434'E, 19 November 1999, RT Schuh, G Cassis and R Silveira, locality code SWA99-L13, ex *Eucalyptus* sp. (WAM). Paratypes: 2♀, same data as holotype (AM; UNSW).

Diagnosis. *Thaumastocoris kalaako* is recognised by the following combination of characters: body elongate, small; elongate labium, reaching the posterior margin of the forecoxae; mandibular plates flared anteriorly; medial margin of corium convex; abdomen strongly expanded laterally (Figure 5B). It can be distinguished from *T. freomooreae* by its elongate labium and the convex medial margin of the corium. The labium of *T. freomooreae* reaches the anterior margin of the forecoxae and the medial margin of the corium is excavate distally. In addition, *T. kalaako* is much smaller in size than *T. freomooreae*.

Description. Submacropterous. Female length 2.29–2.37, width 0.86–0.91. **Colouration**. Dorsum yellowish brown with contrasting cream and medium brown to fuscous markings. *Head*: mostly light cream; vertex and clypeus yellowish brown; lateral margins of mandibular plates and genae with fuscous stripe; genae and bucculae straw-coloured; gula yellowish brown. *Antennae*: mostly yellowish brown; apical half of AIII and two-thirds AIV dark brown (Figure 5B). *Labium*: LI–LIII straw-coloured; apex LIV fuscous. *Pronotum*: mostly yellowish brown, callosite region fuscous medially; disc cream medially. *Thoracic sterna*: prosternum mostly dark brown, paler anteriorly; mesosternum mostly dark brown, paler laterally. *Scutellum*: dark brown anteriorly, midline yellowish brown. *Hemelytra*: mostly yellowish cream, clavus more cream; membrane cream, medially infused with brown (Figure 5B). *Legs*: mostly yellowish brown, with second tarsomere light brown. *Abdomen*: uniformly yellowish brown. **Texture**. Dorsum polished, with scattered shallow to deep setose punctures. *Head*: vertex mostly impunctate; epicranial suture with irregular distribution of shallow punctures; mandibular plates irregularly punctate, denser posteriorly, punctures shallow. *Pronotum*: callosite region sparsely punctate, punctures shallow, denser along midline and anterolateral angles; disc densely and regularly punctate, punctures deep, posterolateral angles impunctate. *Thoracic pleura and sterna*: propleuron irregularly punctuate, punctures shallow, denser posteriorly; thoracic sterna mostly with sparsely and irregularly punctate; mesosternum strongly polished. *Scutellum*: densely and regularly punctate, punctures deep and fine, midline polished posteriorly. *Hemelytra*: clavus and corium with uniform and moderate distribution of deep punctures, larger than on pronotal disc (Figure 5B). *Abdomen*: impunctate, moderately polished. **Vestiture**. Dorsum with uniform distribution of setose punctures, setae short, erect, straw-coloured. Ventral surface of body with fine, straw-coloured, decumbent setae, most densely distributed on ventral aspect of mandibular plates, gula and lateral margins of prosternum; mesosternum with setae irregularly distributed medially, sparse laterally. *Antennae*: uniform distribution of decumbent setae intermixed with fine erect setae; AIII–AIV with same setae on lateral margins, otherwise bare. **Structure.** *Head*: mandibular plates elongate, surpassing clypeus by less than length of clypeus, contiguous subapically, flared anteriorly, weakly concave dorsally, anterolateral margins weakly recurved; bucculae strongly arcuate, weakly explanate posteriorly; gula weakly concave. *Eyes:* moderately pedicellate. *Antennae*: AI and AII cylindrical; AII slightly expanded distally; AIII and AIV dorsoventrally flattened; AIV weakly lanceolate. *Labium*: elongate, reaching posterior margin of forecoxae. *Pronotum*: constricted medially; callosite region and disc subequal, disc a little broader; callosite region strongly depressed along midline; anterolateral angles weakly tuberculate; lateral margin of disc weakly arcuate. *Thoracic pleura and sterna*: propleuron weakly swollen posteroventrally; prosternum weakly concave anteriorly, posterolateral margins weakly truncate. *Hemelytra*: at rest extending to basal abdominal TVIII; medial margin of corium convex; apex of corium at membrane blunt, medial margin more than 45° to costal margin (Figure 5B). *Legs*: forecoxal separation equal to slightly wider than coxal width; fore and mesofemora strongly incrassate; fossula spongiosa short, reaching distal half of second tarsomere.

Male unknown.

Measurements. See Table 2.

Distribution. This species is only known from the type locality, south of Kalgoorlie, in the Goldfields district of Western Australia (Figure 20B).

Host plant. *Thaumastocoris kalaako* is known only from an unidentified species of *Eucalyptus* (Table 3).

Remarks. *Thaumastocoris kalaako* is the smallest *Thaumastocoris* described to date. The convex medial margin of the corium and blunt angle at which this margin meets the membrane are unique to this species.

Thaumastocoris macqueeni Rose, 1965

(Figure: 5A)

Thaumastocoris macqueeni Rose, 1965: 144 (description); Cassis and Gross 1995: 393 (catalogue); Cassis, Schuh and Brailovsky 1999: 31 (taxonomy)

Holotype: ♂, QUEENSLAND: Tibrogargan Creek, via Caboolture, 30 viii 1963, A Macqueen, *Thaumastocoris macqueeni* HA Rose, T6511 (QM).

Diagnosis. *Thaumastocoris macqueeni* is recognised by the following characters: macropterous; ovoid body shape; light brown colouration; mandibular plates weakly concave dorsally; moderately pedicellate eyes (Figure 5A). It can be distinguished from *T. petilus*, which has weakly pedicellate eyes, by the macropterous wing condition and ovoid body shape. In addition, *T. petilus* is narrow in shape, with the hemelytra just extending to TIX, resulting in the abdomen being visible caudally. *Thaumastocoris petilus* is also straw-coloured with cream markings (Figure 7C,D), and not dark brown as in *T. macqueeni* (Figure 5A).

Redescription. Macropterous. Male length 2.94, width 1.19. **Colouration**. Dorsum light brown with contrasting dark brown to fuscous markings. *Head*: mostly light yellowish brown; vertex medium brown; clypeus dark brown; lateral margins of mandibular plates and genae with dark brown stripe; gula and bucculae fuscous. *Antennae*: mostly light brown; AIII and AIV darker brown. *Labium*: mostly light brown; apex of LIV fuscous. *Pronotum*: mostly light yellowish brown; midline of callosite region dark brown; disc yellowish brown medially (Figure 5A). *Thoracic pleura and sterna*: pleura mostly dark brown; proepimeron paler posteriorly; sterna uniformly dark brown. *Scutellum*: mostly fuscous, light yellowish brown posteriorly. *Hemelytra*: yellowish brown; corium becoming dark brown to fuscous distally; membrane light yellowish brown, apically infused with medium brown (Figure 5A). *Legs:* femora dark brown; tibiae light yellowish brown, distal half of second tarsomere dark brown. *Abdomen*: uniformly dark brown, lateral margins light brown. **Texture**. Dorsum moderately polished, with scattered shallow to moderately deep, setose punctures. *Head*: vertex impunctate; epicranial suture with shallow irregular punctures; genae sparsely punctate, punctures fine; mandibular plates irregularly punctate, punctures shallow. *Pronotum*: callosite region polished, irregular distribution of shallow punctures along midline and anterolateral angles; disc densely and regularly punctate, punctures moderately deep, humeral angles impunctate. *Thoracic pleura and sterna*: proepimeron with regular distribution of shallow punctures; thoracic sterna mostly with irregular distribution of sparse, shallow punctures. *Scutellum*: densely and regularly punctate, punctures moderately deep, midline polished posteriorly. *Hemelytra*: clavus and corium with uniform and moderate distribution of deep punctures, larger than on pronotal disc (Figure 5A). *Abdomen*: impunctate, moderately polished. **Vestiture**. Dorsum with uniform distribution of setose punctures, setae short, erect, straw-coloured. Lateral aspects of body with uniform, fine, light straw-coloured, decumbent setae. Ventral surface of body with shorter decumbent setae, most densely distributed on mandibular plates and medially on prosternum. *Antennae*: uniform distribution of decumbent setae intermixed with fine, erect setae; AIII–AIV with same setae on lateral margins, otherwise bare. **Structure.** *Head*: mandibular plates elongate, surpassing clypeus by less than clypeal length, contiguous medially, flared anteriorly, weakly concave dorsally, anterolateral margins weakly recurved; vertex weakly swollen; genae swollen; bucculae weakly arcuate; gula weakly concave. *Eyes*: moderately pedicellate. *Antennae*: AI and AII cylindrical; AIII and AIV weakly dorsoventrally flattened; AII weakly distally expanded. *Labium*: elongate, reaching midpoint of forecoxae. *Pronotum*: weakly constricted medially; callosite region longer in length than disc, disc broader; callosite region depressed along midline; anterolateral angles oblique; lateral margins of disc weakly arcuate. *Thoracic pleura and sterna:* metapleuron weakly swollen posteroventrally; prosternum broad anteriorly. *Hemelytra*: covering abdomen; medial margin of corium convex, apex of corium at membrane blunt, medial margin more than 45° to costal margin (Figure 5A). *Legs*: forecoxal separation greater than coxal width; fore and mesofemora strongly incrassate; fossula spongiosa elongate, reaching distal margin of second tarsomere; tibial teeth not observable. *Male Genitalia*: paramere subrectangular.

Female unknown.

Measurements. See Table 2.

Distribution. The single specimen of *T. macqueeni* was collected at Tibrogargan Creek, near Caboolture, in southeast Queensland (Figure 20B).

Host plant. Unknown.

Remarks. The macropterous hemelytra of *T. macqueeni* are unique to this species. The paramere was illustrated by Rose (1965) and is subrectangular, similar to that of *T. nadeli* or *T. slateri*.

Thaumastocoris majeri Noack, Cassis & Rose n.sp.

(Figures: 5C,D; 12A–H; 18D)

Etymology. This species is name in honour of Professor Jonathan Majer, Curtin University, who collected the type series.

Holotype: ♂, WESTERN AUSTRALIA: Northam, 31° 39'S 116° 40'E, October 1999, JD Majer, ex *Eucalyptus rudis* (WAM). Paratypes: 7♂, 5♀ same data as holotype (AM; UNSW).

Diagnosis. *Thaumastocoris majeri* is recognised by the following characters: body elongate; dorsum yellowish brown; mandibular plates gently and evenly rounded (Figure 5C,D); labium short, reaching just past anterior margin of prosternum (Figure 12B); pronotum moderately constricted (Figure 5C,D; 12D); abdomen visible beyond costal margins of hemelytra (Figure 5C,D); pygophoral lock elongate, slightly concave medially, with subapical notch; paramere securiform, elongate, weakly spatulate apically (Figure 18D). *Thaumastocoris majeri* can be distinguished from *T. freomooreae* by its shorter labium. The labium of *T. freomooreae* is longer, reaching the anterior margin of the forecoxae. *Thaumastocoris majeri* can be distinguished from *T. nadeli* and *T. peregrinus* by its antennal colouration. In *T. majeri* the apical half of AIII and apical two-thirds of AIV are dark brown. Whereas in *T. nadeli* and *T. peregrinus*, only the apical half of AIV is dark (cf. Figure 6A,B; 7A,B).

Description. Submacropterous. Male length 2.53–2.73, width 0.84–0.91; female length 2.65–2.84, width 0.91–1.07. Females slightly larger and dorsum darker than males; thoracic sterna of females slightly lighter (Figure 5C,D). **Colouration**. Dorsum yellowish brown with contrasting dark brown to fuscous markings. *Head*: mostly yellowish brown; vertex medium brown; lateral margins of mandibular plates and genae with fuscous stripe; genae, gula and bucculae straw-coloured. *Antennae*: mostly yellowish brown; apical half of AIII and apical three quarters of AIV light to dark brown. *Labium*: LI–LIII dark straw-coloured; apex LIV fuscous. *Pronotum*: mostly yellowish brown; disc cream-coloured medially (Figure 5C,D). *Thoracic sterna*: prosternum dark brown; mesosternum dark brown paler laterally. *Scutellum*: dark brown anteriorly, posterior half of midline straw-coloured. *Hemelytra*: yellowish brown, with clavus more cream; membrane cream, medially infused with brown (Figure 5C,D). *Legs*: mostly straw-coloured, distal half of second tarsomere dark brown. *Abdomen*: uniformly yellowish brown. **Texture**. Dorsum moderately polished, with scattered shallow to deep setose punctures. *Head*: vertex mostly impunctate, with transverse puncticulate rows sometimes visible, punctures shallow; epicranial suture with irregular distribution of shallow to moderately deep punctures; mandibular plates irregularly punctate, denser posteriorly, punctures shallow (Figure 12A). *Pronotum*: callosite region sparsely punctate, punctures shallow, denser along midline and anterolateral angles; disc densely and regularly punctate, punctures deep; humeral angles impunctate (Figure 12D). *Thoracic pleura and sterna*: propleuron irregular distribution of shallow punctures; metapleural suture marked by single row of fine punctures; thoracic sterna mostly with sparse and irregular distribution of punctures; mesosternum strongly polished, midline with fine shallow punctuation. *Scutellum*: densely and regularly punctate, punctures deep, midline polished posteriorly. *Hemelytra*: clavus and corium with uniform and moderate distribution of deep punctures, as on pronotal disc (Figure 5C,D). *Abdomen*: impunctate, moderately polished. **Vestiture**. Dorsum with uniform distribution of setose punctures, setae short erect straw-coloured. Venter with fine straw-coloured, decumbent setae, most densely distributed on ventral aspect of mandibular plates, gula and prosternum (Figure 12B); mesosternum with irregular distribution of setae medially, sparse laterally. *Antennae*: uniform distribution of decumbent setae intermixed with fine erect setae; AIII–AIV with same setae on lateral margins, otherwise bare (Figure 12C). *Male genitalia*: pygophore clothed in fine setae, more elongate and denser near genital opening; pygophoral lock with larger setae surrounding subapical notch; paramere evenly beset with setae, becoming bare apically (Figure 18D). **Structure.** *Head*: mandibular plates elongate, surpassing clypeus by length of clypeus, contiguous posteromedially, flared anteriorly, concave dorsally, anterolateral margins strongly and evenly recurved (Figure 12A); bucculae strongly arcuate, weakly explanate posteriorly (Figure 12B); gula weakly excavate. *Eyes*: moderately pedicellate. *Antennae*: AI and AII cylindrical; AII slightly expanded distally; AIII and AIV

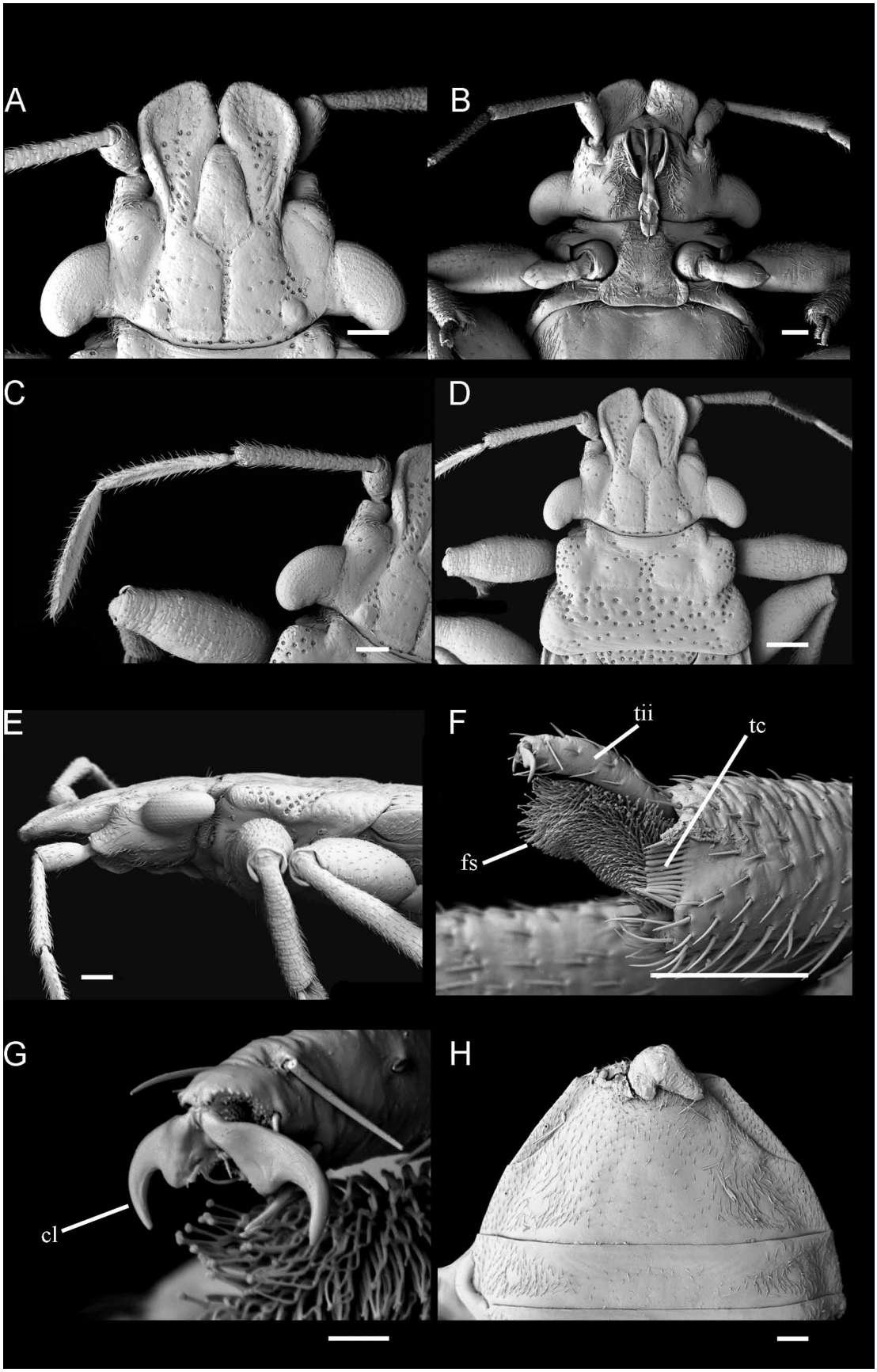

FIGURE 12. Scanning electron micrographs: *Thaumastocoris majeri*. **A** ♀ head, dorsal view. **B** ♀ head and prosternum, ventral view. **C** ♀ antenna, dorsal view. **D** ♀ head and pronotum, dorsal view. **E** ♀ head and thorax, lateral view. **F** ♀ foretarsus, lateral view. **G** ♀ tarsal claw, anterolateral view. **H** ♀ genitalia, ventral view. cl = claw, fs = fossula spongiosa, tc = tibial comb, tii= second tarsomere. Scale bar = 0.1mm except for **G** scale bar = 0.01mm.

dorsoventrally flattened; AIV weakly lanceolate (Figure 12C). *Labium*: short, reaching just past anterior margin of prosternum (Figure 12B). *Pronotum*: moderately constricted medially; callosite region and disc subequal in length, disc a little broader; callosite region depressed along midline; anterolateral angles weakly tuberculate; lateral margin of disc weakly arcuate (Figure 12D). *Thoracic pleura and sterna*: propleuron weakly swollen posteroventrally; prosternum weakly swollen anteriorly, posterolateral margins weakly flared and rounded (Figure 12B). *Hemelytra*: at rest extending to basal third of pygophore; medial margin of corium weakly excavate distally; apex of corium at membrane narrowed, medial margin less than 45° to costal margin (Figure 5C,D). *Legs*: forecoxal separation equal to slightly wider than coxal width (Figure 12B); fore and mesofemora strongly incrassate; fossula spongiosa elongate, reaching distal margin of second tarsomere (Figure 12F); 3–6 foretibial teeth, 4–8 mesotibial, 0–5 metatibial teeth. *Male Genitalia*: pygophoral lock elongate, weakly concave medially with subapical notch; paramere securiform, elongate distally, apex weakly spatulate (Figure 18D).

Measurements. See Table 2.

Distribution. *Thaumastocoris majeri* is known only from the type locality, east of Perth, Western Australia (Figure 20B).

Host plant. *Thaumastocoris majeri* is only known from *Eucalyptus rudis*, an endemic of southwest Western Australia (Table 3).

Remarks. The pygophore of this species is more exaggerated than other species of *Thaumastocoris*, with a subapical notch on the elongate pygophoral lock and a securiform shaped paramere, which is spatulate apically (Figure 18D).

Thaumastocoris nadeli Noack, Cassis & Rose n.sp.

(Figures: 6A,B; 13A–H; 19A)

Etymology. This species is named in honour of Ryan Nadel, from the Forestry and Agricultural Biotechnology Institute (FABI), University of Pretoria, who collected the type series and many additional specimens.

Holotype: ♂, WESTERN AUSTRALIA: Swan River, Perth, 16 m. 31°57.998'S 115°50.732'E, 30 May 2008, R Nadel, ex *Eucalyptus camaldulensis* (WAM). Paratypes: 5♂, 5 ♀, same data as holotype (AM; UNSW); 2♂, Cape Naturaliste National Park, 50 m, 33°32'25"S 115°00'44"E, 14 December 1997, RT Schuh, G Cassis, H Brailvosky, locality code WA97-L49-H89, ex *Dryandra sessilis* (Knight) Domin (PERTH 05055288) (AM); 2♂, 2♀, South West Hwy, Boyanup, December 2010, A.E. Noack, ex *Eucalyptus nicholii*; 1♀, Conspicuous Beach, Walpole-Nornalup National Park, 10 km E of Nornalup, 30 m, 35°02'14"S 116°5'39"E, 17 December 1997, RT Schuh, G Cassis, H Brailovsky and A Asquith, locality code WA97-L58-H116, ex *Agonis flexuosa* (Wild.) Sweet (PERTH 05055423) K157158 (AM); 2♂, 2♀, South West Hwy, Donnybrook, December 2010, A.E. Noack, ex *Eucalyptus scoparia* ; 2♂, 3♀, Exmouth, Truscott Crescent, opposite Pony Club, 21.94606S 114.1358E, 31 October 2004, G Cassis, MA Wall, C Weirauch, N Tatarnic and C Symonds, locality code PBI-WA04-L29-H195, ex *Acacia* sp. (AM; UNSW); 18♂, 16♀, 1 nymph, Forest Grove Road, 0.9 km E of Caves Road, 60 m, 30°04'20"S 115°02'46"E, 15 December 1997, RT Schuh, G Cassis, H Brailovsky and A Asquith, locality code WA97-L51-H97, ex *Kunzea glabrescens* (PERTH 05056330) (AM; UNSW); 1♂ Highbury, 33°00,828S; 115°13,838E, 329 m, ML Moir, 1 July 2008, ex *Eucalyptus wandoo* MLM 00687 (MMPC); 1♂ Highbury, 329 m, 33°00,828S; 117°13,838E, 02 July 2008; M.L. Moir, (beat) ex *Eucalyptus sideroxylon* MLM00677 (MMPC); 13♂, 6♀, 6 nymphs Mosman Park, Perth 32°01'33"S 115°45'57"E sea level, 7 August 1999 G. Cassis (L2) *Eucalyptus* sp. (AM); 5♂, 3♀, 3 nymphs Mosman Park, Perth 32°01'33"S 115°45'57"E 20 m 5 December 1998 G. Cassis [98-L22] *Eucalyptus* sp. (PERTH 05227313) Host/98-31, (AM); 2♂ Mosman Park, Perth 32°01'33"S 115°45'57"E 20 m, 24 November 1998 G. Cassis [98-L1] *Agonis flexuosa* (Wild.) Sweet (PERTH 05227410) Host/98-1 (AM); 1♀ Mosman Park, Perth 32°01'33"S 115°45'57"E 20 m, 30 November 1998, G Cassis [98-L10] *Hemiandra glabra* Benth. (PERTH 05227348) Host/98-21 (AM); 5♂, 4♀ Perth: Coles store on Falkirk and Morrison St. Alt. 20 m, S31°55.784'; E115°53.830' 30 May 2008, R. Nadel, *Eucalyptus camaldulensis*, (AM; UNSW); 3♂, 3♀ Perth: Cnr. Fyfe and Bullcreek St., Alt. 28 m, S32°03.073'; E115°51.431' 31 May 2008, R. Nadel, *Eucalyptus camaldulensis*, (AM; UNSW); ♂3, 3♀ Perth: Thomas Oval, Medina Park, Alt. 8 m, S32°13.974'; E115°47.938' 31 May 2008, R. Nadel, *Eucalyptus camaldulensis* (AM).

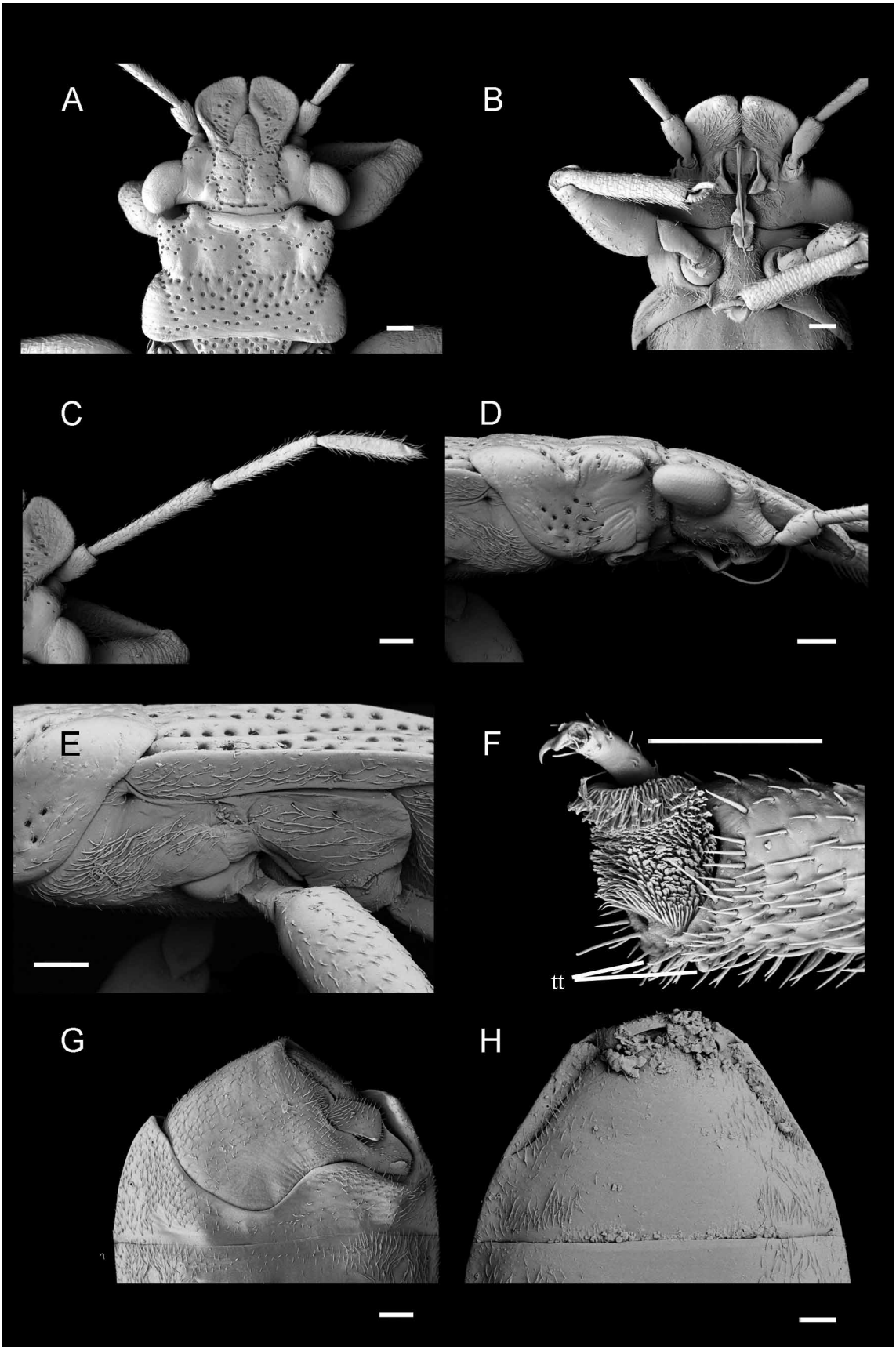

FIGURE 13. Scanning electron micrographs: *Thaumastocoris nadeli*. **A** ♂ head and pronotum, dorsal view. **B** ♂ head and pro sternum, ventral view. **C** ♂ antenna, dorsal view. **D** ♂ head and propleura, lateral view. **E** ♂ thorax, lateral view. **F** ♂ midtarsus, lateral view. **G** ♂ genitalia, ventral view. **H** ♀ genitalia, ventral view. tt = tibial tooth. Scale bar = 0.1mm.

Diagnosis. *Thaumastocoris nadeli* is recognised by the following characters: body elongate (Figure 6A,B); mandibular plates strongly recurved laterally (Figure 13A); bucculae weakly arcuate, strongly explanate distally (Figure 13B); pronotum strongly constricted medially.(Figure 6A,B; 13A); pygophoral lock is triangulate, weakly concave medially, narrowing apically to an oblique sharp angle; paramere subquadrate (Figure 19A). It can be distinguished from *T. peregrinus* by the apical margin of the pygophoral lock which is rounded and not obliquely angled (cf. Figure.19B). The females of the two species can be distinguished by the colouration of the pronotal disc. The disc of female *T. nadeli* is fuscous and strikingly darker than the cream disc of the males (Figure 6A,B), whereas the disc of both male and female *T. peregrinus* is cream (cf. Figure 7A,B).

Description. Submacropterous. Male length 2.37–2.88, width 0.74–0.92; female 2.53–2.92, width 0.89–1.05. Females larger and darker in colouration, especially hemelytra and pronotum. **Colouration**. Dorsum cream to yellowish brown with contrasting dark brown to fuscous markings. *Head*: mostly cream-coloured; vertex and clypeus yellowish brown; lateral aspect of mandibular plates and genae with brown to fuscous stripe; genae, gula and bucculae cream-coloured. *Antennae*: mostly yellowish brown; subapical half of AIV dark brown to fuscous (Figure 6A,B). *Labium*: straw-coloured; apex of LIV fuscous. *Pronotum*: mostly yellowish brown, pronotal disc cream medially. *Thoracic pleura and sterna*: mostly yellowish brown; propleura posterior margin more cream-coloured; prosternum cream. *Scutellum*: dark brown, posterior two-thirds of midline straw-coloured. *Hemelytra*: yellowish brown, with clavus cream-coloured; medial margin of corium dark brown; membrane cream, medially infused with brown (Figure 6A,B). *Legs*: mostly straw-coloured, with distal half of second tarsomere dark brown. *Abdomen*: uniformly yellowish brown. **Texture.** Dorsum moderately polished, with scattered shallow to deep setose punctures. *Head*: vertex mostly impunctate, with transverse puncticulate rows sometimes visible, punctures shallow; epicranial suture with irregular distribution of shallow to moderately deep punctures; mandibular plates irregularly punctate, denser posteriorly, punctures shallow (Figure 13A). *Pronotum*: callosite region sparsely punctate, punctures shallow, denser along midline and anterolateral angles; disc densely and regularly punctate, punctures deep, posterolateral angles impunctate (Figure 13A). *Thoracic pleura and sterna*: propleuron with regular distribution of fine punctures posteroventrally (Figure 13D); thoracic sterna mostly with sparse, irregular distribution of shallow punctures; mesosternum strongly polished. *Scutellum*: densely and regularly punctate, punctures deep, midline polished (Figure 6A,B). *Hemelytra*: clavus and corium with uniform distribution of deep punctures, larger than on pronotal disc. *Abdomen*: impunctate, moderately polished. **Vestiture**. Dorsum with uniform distribution of setose punctures, setae short, erect, straw-coloured. Lateral aspects with irregular distribution of fine, straw-coloured, decumbent setae, most densely distributed posteroventral on propleura and ventrally mesopleura (Figure 13E). Ventral surface with irregular distribution of fine setae, most densely distributed on mandibular plates (Figure 13B). *Antennae*: uniform distribution of decumbent setae intermixed with fine, erect setae; AIII–AIV with same setae on lateral margins, otherwise bare (Figure 13C). *Male genitalia*: pygophore with irregular distribution of fine setae, more elongate and dense near genital opening, pygophoral lock with sparse and distribution of irregular setae; paramere evenly beset with setae, becoming sparse apically (Figure 19A). **Structure.** *Head*: mandibular plates elongate, surpassing clypeus by length of clypeus, contiguous medially, flared anteriorly, concave dorsally, anterolateral margins strongly recurved (Figure 13A); bucculae weakly arcuate, strongly explanate posteriorly (Figure 13B). *Eyes*: moderately pedicellate. *Antennae*: AI to AIII cylindrical; AII weakly distally expanded; AIV weakly lanceolate (Figure 13C). *Labium*: short, reaching past anterior margin of prosternum (figure 13B). *Pronotum*: strongly constricted medially; callosite region and disc subequal in length, disc a little broader; anterolateral angles strongly tuberculate; lateral margins of disc weakly arcuate (Figure 13A). *Thoracic sterna*: prosternum weakly swollen medially, lateral margins rounded (Figure 13B). *Hemelytra*: at rest extending to abdominal TIX; medial margin of corium straight to weakly convex, apex of corium at membrane strongly narrowed medial margin less than 45° to costal margin (Figure 6A,B). *Legs*: forecoxal separation equal to slightly wider than coxal width (Figure 13B); fore and mesofemora strongly incrassate; fossula spongiosa elongate, reaching distal half of second tarsomere (Figure 13B); 3–4 foretibial teeth, 3–4 mesotibial teeth, without metatibial teeth. *Male Genitalia*: pygophoral lock triangulate, weakly concave medially, narrowing apically to oblique sharp angle; paramere subquadrate (Figure 19A).

Measurements. Table 2

Distribution. *Thaumastocoris nadeli* is known from southwestern Australia, suburban Perth, and Exmouth, north of Perth (Figure 20B).

Host plants. *Thaumastocoris nadeli* has been collected from four different plant families, with most of the records from the family Myrtaceae (Table 3). It has been collected on numerous species of *Eucalyptus* spp, particularly *Eucalyptus camaldulensis.* It is also known from the myrtle species, *Agonis flexuosa* and *Kunzea glabrescens* in southwest Western Australia. East of Perth it has been collected on *Eucalyptus sideroxylon* and *E. wandoo*, and with the latter record it was found in association with *T. freomooreae*. Some 1000 km north of Perth, at Exmouth, it was collected on an unidentified species of *Acacia* (Fabaceae). The records of *Hemiandra glabra* (Lamiaceae) and *Dryandra sessilis* (Proteaceae) are possibly sitting records, with two specimens taken from each plant.

Remarks. This species is the only known species *Thaumastocoris* where the female is easily recognised from conspecific males by colouration alone. Typically, females of *Thaumastocoris* are slightly darker in colouration, but in this species the pronotal disc is strikingly fuscous to black, whereas in males it is cream-coloured. This sexual dimorphism in colouration is consistent in all populations.

Thaumastocoris ohallorani Noack, Cassis & Rose n.sp.

(Figures: 6C,D; 18G,H)

Etymology. This species is named in honour of Mr. David O'Halloran in recognition of his generous support of *Thaumastocoris* research.

Holotype: ♂, AUSTRALIA: South Australia: 5 km N Yunta trwd Arkaroola, 250 m, 32°32'S 139°33,E, October 29, 1995, Schuh and Cassis [95-35]. Host: *Eucalyptus porosa* F. Muell. ex miq. Det: K.D. Hill 1996 NSW 395957 site 95-35 host 95-58 (AM); Paratypes: 2♂, 4♀ same data as holotype (AM; UNSW).

Diagnosis. *Thaumastocoris ohallorani* can be recognised by the following combination of characters: body narrow and elongate; dorsum golden yellow; mandibular plates evenly rounded apically and slightly contiguous medially, moderately long labium, pronotum moderately constricted (Figure 6C,D); paramere elongate and spatulate apically (Figure 18G,H*). Thaumastocoris ohallorani* can be distinguished from *T. freomooreae* by the paramere, which in *T. freomooreae* is recurved apically (cf. Figure 18C), whereas the *T. ohallorani* paramere is spatulate.

Description. Submacropterous. Male length 2.77–2.92, width 0.80–0.95; female length 2.84–3.00, width 0.96–1.05. Females similar to male but larger in size, dorsum slightly lighter in colouration. **Colouration**. Dorsum light golden coloured to yellowish brown with contrasting cream to light brown. *Head*: mostly straw-coloured; vertex more yellow; lateral aspect of mandibular plates and genae with light brown stripe; genae, gula and bucculae straw-coloured. *Antennae*: AI and AII straw-coloured, male antennal segments AII and AIV unknown (Figure 6C,D). *Labium*: LI–LIII straw-coloured; apex of LIV dark brown. *Pronotum*: mostly yellowish brown; midline of callosite region brown; disc cream-coloured medially. *Thoracic pleura and sterna*: mostly straw-coloured, propleura and prosternum darker. *Scutellum*: yellowish brown anteriorly, posterior half of midline straw-coloured. *Hemelytra*: mostly yellowish to light golden yellow; clavus and membrane cream, with membrane medially infused with light brown (Figure 6C,D). *Legs*: uniformly light golden yellow, with distal half of second tarsomere light brown. *Abdomen*: uniformly light golden yellow colour. **Texture**. Dorsum polished, with scattered shallow to deep setose punctures. *Head*: vertex mostly impunctate, with transverse puncticulate rows sometimes visible, punctures shallow; epicranial suture with irregular distribution of shallow to moderately deep punctures; mandibular plates with regular distribution of punctures posteriorly and medially, punctures shallow. *Pronotum*: callosite region sparsely punctate, punctures shallow, denser along midline and anterolateral angles; pronotal disc densely and regularly punctate, punctures deep; humeral angles impunctate (Figure 6C,D). *Thoracic pleura and sterna*: propleuron with deep irregular distribution of punctures posteriorly; metepisternum and metepimeron with fine irregular punctation; prosternum transversely finely rugulose anteriorly on midline; mesosternum strongly polished medially. *Scutellum*: densely and regularly punctate, punctures deep, midline polished posteriorly. *Hemelytra*: clavus and corium with uniform and moderately dense distribution of deep punctures, slightly larger than as in pronotal disc (Figure 6C,D). *Abdomen*: impunctate, moderately polished. **Vestiture**. Dorsum with uniform distribution of setose punctures, setae short erect, straw-coloured. Lateral and ventral aspects of body, with elongate, shiny, straw-coloured, decumbent setae, shorter and denser adjacent to bucculae, anteromedially on prosternum and medial to mesocoxal cavity; mesosternum with irregular distribution of setae, sparse medially. *Antennae*: AI and AII with uniform distribution of decumbent setae intermixed with fine erect setae; AIII and AIV. *Male genitalia*: pygophore

irregularly clothed with fine seta, more dense near genital opening, pygophoral lock with irregular distribution of setae, becoming sparse at angles; paramere evenly beset with dense seta, becoming bare apically (Figure 18G,H). **Structure.** *Head*: mandibular plates elongate, surpassing clypeus by length of clypeus, contiguous medially, moderately flared anteriorly, moderately concave dorsally, anterolateral margins moderately and evenly recurved (Figure 6C,D); bucculae moderately arcuate, weakly explanate posteriorly; gula weakly concave. *Eyes*: moderately pedicellate. *Antennae*: AI and AII cylindrical. *Labium*: moderately long, reaching just past anterior margin of prosternum. *Pronotum*: weakly constricted medially; callosite region and disc subequal in length, disc a little broader; callosite region depressed along midline; anterolateral angles weakly tuberculate; lateral margin of disc weakly arcuate (Figure 6C,D). *Thoracic sterna*: prosternum moderately concave anteriorly. *Hemelytra*: at rest extending to anterior third of pygophore; medial margin of corium convex medially, weakly excavate distally; apex of corium at membrane narrowed, medial margin less than 45° to costal margin (Figure 6C,D). *Legs*: forecoxal separation equal to slightly wider than coxal width; fore and mesofemora strongly incrassate; fossula spongiosa reaching distal margin of second tarsomere; 4–5 foretibial teeth, 2–4 mesotibial teeth, metatibial without teeth. *Male Genitalia*: pygophoral lock trapezoidal, with angles flared and rounded; paramere elongate, spatulate apically (Figure 18G,H).

Measurements. See Table 2.

Distribution. *Thaumastocoris ohallorani* is represented from a single collection site north of Yunta in the southern Flinders Ranges, South Australia (Figure 21A).

Host plant. This species was collected from *Eucalyptus porosa*, a common species of mallee found throughout the Flinders Rangers and drier areas of western New South Wales and north western Victoria (Table 3).

Thaumastocoris peregrinus Carpintero and Dellapé, 2006

(Figures: 7A,B; 14A–H; 19B)

Thaumastocoris peregrinus Carpintero and Dellapé, 2006: 61 (description); Noack and Rose 2007: 27 (biology).
Thaumastocoris australicus: Jacobs and Neser 2005: 233 (misidentification); Noack and Coviella 2006: 13 (misidentification).

Holotype: ♂, ARGENTINA, Buenos Aires, La Plata, XI-2005, on *Eucalyptus* sp., Carpintero-Dellapé colls (MLP).

Other material examined. AUSTRALIA: AUSTRALIAN CAPITAL TERRITORY: 2♂, 2♀, Canberra, 35°16’34.28”S 149°07’24.39”E, 16 August 2004, AE Noack, ex *Eucalyptus* sp. (AM); NEW SOUTH WALES: 5♂, 5♀, Sydney, Carlingford Shopping Centre, Rembrandt Street, 33°46’33.75”S 151°03’05.27E, 17 July 2001, AE Noack, ex *Eucalyptus scoparia* (AM; UNSW); Sydney, Hornsby, opposite Hornsby Nissan Centre, corner Carden Ave, 33°42’46.76”S 151°06’27.43”E, 2 August 2001, AE Noack, ex *Eucalyptus scoparia* 7♂, 9♀ (AM); 3♂, 4♀, Sydney, Moorebank, 33 Heathcote Road, nr Service Centre, 33°56’05.50”S 150°56’05.78”E, 18 July 2001, AE Noack, ex *Eucalyptus nicholii* (AM); 4♂, 5♀, Sydney, Leumeah, 96 Waminda Ave. 34°04’12.44”S 150°49’53.78”E, 18 July 2001, AE Noack, ex *Eucalyptus nicholii* (AM); 3♂, 2♀, Sydney, Sutherland, nr tennis court, Rawson Ave. Leisure Centre, 34°02’22.82”S 151°03’21.61”E, 18 July 2001, AE Noack, ex *Eucalyptus scoparia* (AM); 1♂, 2♀, Sydney, Sutherland, car park Rawson Ave. Leisure Centre. 34°02’15.33”S 151°03’18.28”E, 18 July 2001, AE Noack, ex *Eucalyptus scoparia* (AM); 3♂, Sydney, Sutherland, Waratah St., 34°01’38.61”S 151°03’55.07”E, 22 June 2005, AE Noack, ex *Eucalyptus sideroxylon* (AM); 2♀, Sydney, Sutherland, Waratah St. 34°01’39.43”S 151°04’01.30”E, 13 August 2004, AE Noack, ex *Eucalyptus scoparia* (AM); 2♂, 2♀, Sydney, Birrong, 163 Woods St. 33°53’58.43”S 151°00’48.58”E, 2 August 2001, AE Noack, ex *Eucalyptus scoparia* (AM); 4♂, 3♀, Sydney, Dee Why, Roache Chemicals complex 4–10 Inman Road, 33°44’13.24”S 151°17’05.08”E, 9 August 2001, AE Noack, ex *Eucalyptus scoparia* (AM); 3♂, Ingleburn,34°00’25”S 150°53’38”E (AM); 10♂, 10♀, North Rocks, 219 North Rocks Road, Lever Rexona site, 33°47’04”S 151°00’32”E, 5 August 1999, M. Brownas, ex *Eucalyptus scoparia* (AM); 10♂, 2♀, 10 nymphs, Sydney, Como. 34°00’15”S 151°04’05”E, 2 June 1999, E.E. Taylor, ex *Eucalyptus scoparia* (AM; UNSW); 2♂, Sydney, Stanmore, cr. Harrow Lane and Trafalgar Streets, 33°53’39.88”S 151°10’01.01”E, 21 January 2002, AE Noack, ex *Eucalyptus nicholii* (AM); 2♂, Sydney, Camperdown, University of Sydney campus, 33°53’14.65”S 151°11’25.76”E, 7 August 2001, HA Rose, ex *Eucalyptus scoparia* (AM); 1♂, Sydney, Olympic Park, Homebush, 33°51’07.07”S 151°04’01.38”E, 27 August 2002, AE Noack, ex *Eucalyptus nicholii* (AM); 5♂, Sydney, Mosman, 33°49’40.02”S 151°15’01.95”E, 17 July 2002, AE Noack, ex *Eucalyptus viminalis* (AM); 5♂, 2♀, Sydney, Mosman, 33°49’50.87”S 151°15’29.86”E, 15 July 2002,

AE Noack, ex *Eucalyptus tereticornis* (AM); 1♂, 1♀, Sydney, Forestville, 4 Tora Place, 33°46'02.11"S 151°12'41.76"E, 21 May 1999, P van der Watt, ex *Eucalyptus nicholii*, NSW Forest Dept S5880 (AM); 1♀, Sydney, Holsworthy, 145 Bardia Road, 33°57'26.91"S 150°56'53.38"E, 20 September 2001, AE Noack, ex *Eucalyptus scoparia* (?) (AM); 3♂, 1♀ ,Coonabarabran: 31°16'S 149°17'E, 10 April 2004, AE Noack, ex *Eucalyptus nicholii* (AM); 7♂, 5♀, Cootamundra, 34° 38'S 148° 02'E, 23 March 2006, AE Noack, ex *Eucalyptus scoparia* (AM; UNSW); 4♂, 2♀, 2nymphs, Mudgee, near railway station, 32°35' 27"S 149°35'10"E, 8 April 2004, AE Noack ex *Eucalyptus punctata* (in alcohol) (AM); 6♂, 6♀, Narrandera, 34°45'S 146°33'S, 20 April 2006, AE Noack, ex *Eucalyptus scoparia* (AM; UNSW); 1♂, 3♀, Parkes, cnr Short Street and Highway, in park, 33°08'S 148°11'E, 12 April 2004 AE Noack, ex *Eucalyptus nicholii* (AM); 7♂, 5♀, Wagga Wagga, 35°07'S 147°22'E, 22 March 2006, AE Noack, ex *Eucalyptus scoparia* (AM; UNSW); 3♂, 1♀, Tamworth, Namringha, 31°05'S 150°55'E, 17 May 2001, S. Signor, ex *Eucalyptus scoparia* (AM); 2♂, 2♀,Tamworth, 31°05'S; 150°55'E (AM); 1♂, Darling River, 1.5 km S 'Trilby' Station homestead, 30:39:7S 144:56:1E, 20 December 1999, F. Christie, M. Elliott, locality code locality code DRRP101/02Bt, beating, ex *Eucalyptus camaldulensis* (AM); 1♀, Mogie Melon watercourse, 'Karrawingi' Station, 31:23:34S 148:41:28E, L Wilkie and H Smith, 11 December 1999, *Eucalyptus camaldulensis/ largiflorens* patch, ex *Eucalyptus camaldulensis*, locality code DRRP051/03Bt, beating (AM); 1♀, Darling River, 'Kalyanka,' approx. 11 km E Wilcannia, 31:33:43S 143:29:13E, F Christie and M Elliott, 21 December 1999, *Eucalyptus camaldulensis* patch, ex *Eucalyptus camaldulensis*, locality code DRRP104/01Bt, beating (AM); 1♂, junction of Mobigamy Creek and Carlton- Brewarrina Road, 31:6:38S 147:11:29E, 13 December 1999, R Harris and T Moulds, *Eucalyptus largiflorens* patch, locality code DRRP010C, beating (AM); 8♂, 4♀, bank of Merri Merri Creek, 2.5 km N of Quambone, 30:54:38S 147:51:56E, 14 December 1999, R Harris and T Moulds, *Eucalyptus camaldulensis/largiflorens* patch, locality code DRRP03C, beating (AM); 1♂, 50m E of Boonal Road, 5.2 km NE of jnctn with Moree-Boomi Road, 28:50:26S 149:42:7E, 19 December 1999, R Harris and T Moulds, *C. cristata* patch, locality code DRRP027C, beating (AM). QUEENSLAND: 9♂, 8♀, 9 nymphs, Wondai to Proston Road, 26°15.014'S 151°49.359'E, 20 May 2008, R Nadel, ex *Eucalyptus tereticornis* (AM); 4♂, 4♀, 6 nymphs, Cunnamulla, 28°04'S 145°40'E, July 1994, ex *Eucalyptus* sp. (QM). SOUTH AUSTRALIA: 2♂, 3♀, 1 nymph, Mitcham. 34°58'S 138°37'E, 16 July 1976, RV Southcott, ex *Eucalyptus camaldulensis* (SAMA). 1♀, Mitcham 34°58'S 138°37'E, 18 June 1980, RV Southcott, at light, (SAMA). **ARGENTINA**: 2♂, 3♀, Buenos Aires, Luján, ca. 70 km W downtown Buenos Aires, 34°34'S 59°06'W, C Coviella MT, 23 May 2006 (AM; UNSW); 5♂, Buenos Aires, Prov., La Plata, Mus. Ciencias Naturales,34°55'S 57°57'W, 20 February 2006, TJ Henry, ex *Eucalyptus* sp. (AM). **SOUTH AFRICA**: 6♂, NW Sparkling Waters nr Buffelspoort Magaliesberg, 25°51'S 27°24'E, 21.xi.2004, S Neser and OCN Neser, ex *Eucalyptus camaldulensis*, AcSN 2777 (AM; UNSW); 5♂, 6♀, 3 nymphs, Gauteng Rietondale, Pretoria, 25:43.6S 28:14.2 E, 1320 m, 12.i.2005, S Neser, ex *Eucalyptus camaldulensis*, AcSN 2776 (AM; UNSW).

Diagnosis. *Thaumastocoris peregrinus* is recognised by the following characters: body elongate (Figure 7A,B); mandibular plates strongly recurved anterolaterally (Figure 14A); bucculae weakly arcuate, strongly explanate distally (Figure 14B); pygophoral lock triangulate, weakly excavate medially, narrowing apically to a dull point; paramere subquadrate (Figure 19B). This species can be distinguished from *T. nadeli* by the apical margin of the pygophoral lock which is obliquely angled and not attenuating to a dull point. The females of the two species can be distinguished by their respective pronotal disc colouration in *T. nadeli* it is fuscous to black (cf. Figure 6B), whereas in *T. peregrinus* it is cream (Figure 7B).

Redescription. Submacropterous. Male length 2.45–2.88, width 0.80–0.98; female length 2.57–2.96, width 0.98–1.09. Female larger and darker in colouration, and medial margin of corium more straight to weakly excavate. **Colouration**. Dorsum cream to yellowish brown with contrasting dark brown to fuscous markings (Figure 7A,B). *Head*: mostly cream-coloured; vertex and clypeus yellowish brown to dark brown; lateral areas of mandibular plates and genae with fuscous stripe; genae, gula and bucculae cream-coloured. *Antennae*: mostly yellowish brown; subapical third of AII light brown; subapical half of AIV dark brown to fuscous (Figure 7A,B). *Labium*: straw-coloured; apex of LIV fuscous. *Pronotum*: mostly yellowish brown, pronotal disc cream medially. *Thoracic pleura and sterna*: propleura yellowish brown, posterior margin cream-coloured; mesopleura dark brown anteroventrally; prosternum straw-coloured; mesosternum dark brown. *Scutellum*: dark brown, posterior two-thirds of midline straw-coloured. *Hemelytra*: yellowish brown, with clavus cream-coloured; medial margin of corium yellowish brown to dark brown; membrane cream, medially infused with brown (Figure 7A,B). *Legs*: mostly straw-coloured, with distal half of second tarsomere dark brown. *Abdomen*: uniformly yellowish brown. **Texture**. Dor-

sum moderately polished, with scattered shallow to deep setose punctures. *Head*: vertex mostly impunctate, with transverse puncticulate rows sometimes visible; epicranial suture with shallow to moderately deep irregular punctures; mandibular plates irregularly punctate, denser posteriorly, punctures shallow (Figure 14A). *Pronotum*: callosite region irregularly punctuate, punctures shallow, denser along midline and anterolateral angles; disc densely and regularly punctate, punctures deep, humeral angles impunctate (Figure 14D). *Thoracic pleura and sterna*: propleuron with regular distribution of fine punctures posteroventrally; thoracic sterna impunctate; mesosternum strongly polished. *Scutellum*: densely and regularly punctate, punctures deep, midline polished. *Hemelytra*: clavus and corium with uniform distribution of deep punctures, larger than on pronotal disc (Figure 7A,B). *Abdomen*: impunctate, moderately polished. **Vestiture**. Dorsum with uniform distribution of setose punctures, setae short erect straw-coloured. Ventral surface of body with irregular distribution of fine, straw-coloured, decumbent setae; mesosternum with irregular distribution of setae medially, sparse laterally. *Antennae*: uniform distribution of decumbent setae intermixed with fine erect setae; AIII–AIV with same setae on lateral margins, otherwise bare (Figure 14C). *Male genitalia*: pygophore with irregular distribution of fine setae, more elongate and denser near genital opening; pygophoral lock with sparse and irregular distribution of setae; paramere evenly beset with setae, becoming sparse apically (Figure 19B). **Structure.** *Head*: mandibular plates elongate, surpassing clypeus by length of clypeus, contiguous medially, flared anteriorly, concave dorsally, anterolateral margins strongly recurved (Figure 14A); bucculae, weakly arcuate, strongly explanate posteriorly (Figure 14B). *Eyes*: moderately pedicellate. *Antennae*: AI and AII cylindrical; AIII and AIV dorsoventrally flattened; AII weakly distally expanded; AIV weakly lanceolate (Figure 14C). *Labium*: short, reaching past anterior margin of prosternum (Figure 14B). *Pronotum*: strongly constricted medially; callosite region and disc subequal in length, disc a little broader; anterolateral angles strongly tuberculate; lateral margin of disc weakly arcuate (Figure 14D). *Thoracic sterna*: prosternum weakly swollen medially, lateral margins rounded. *Hemelytra*: at rest extending to basal third of pygophore in male; medial margin of corium straight to weakly convex, apex of corium at membrane strongly narrowed medial margin less than 45° to costal margin (Figure 7A,B; 14F). *Legs*: forecoxal separation equal to slightly wider than coxal width; fore and mesofemora strongly incrassate; fossula spongiosa elongate, reaching distal half of second tarsomere; 3–4 foretibial teeth, 3–4 mesotibial teeth, without metatibial teeth. *Male Genitalia*: pygophoral lock triangulate, weakly excavate medially narrowing apically to a dull point; paramere subquadrate (Figure 19B).

Measurements. See Table 2.

Distribution. *Thaumastocoris peregrinus* is known from southeast Queensland, through much of New South Wales, to the southern gulfs of South Australia (Figure 21A). There are many records of this species from the Murray Darling basin. This species has now been introduced accidentally to Argentina, Chile, Brazil, Uruguay, South Africa, Kenya, and Zimbabwe.

The focus on *Thaumastocoris peregrinus* commenced in 2001, with its dramatic infestation of street trees in the Sydney basin, and then its subsequent invasion of South Africa and South America. However, earlier collection records exist; for example, it was collected on *Eucalyptus camaldulensis* from Mitcham, South Australia in 1976. Since that time, it was collected across a wide geographic area, from Cunnamulla in central Queensland in 1994 to an increasing large number of localities within Sydney in 1999.

Host plants. *Thaumastocoris peregrinus* has been collected on thirteen species of *Eucalyptus* and a single species of *Corymbia* (Table 3).

Remarks. This species was described by Carpintero and Dellapé (2006) from an introduced population to Argentina, which was infesting an unidentified species of *Eucalyptus* in a Buenos Aires park. Unfortunately, they described this species on Argentinean material and fail to account for the variation in native Australian populations.

Some of their diagnostic characters are not supported by this work. For example, the anterolateral angle of the pronotal callosite region is strongly tuberculate and does not possess a tubercle as they report in their original description. Comparison with either *T. safordi* or *T. slateri,* which have tubercles, demonstrates the difference in this character (Figure 16B,E).

The pygophore *T. peregrinus* exhibits fluctuating asymmetry and can be oriented to either the right or left. Field studies have found that approximately one in 250 males have their pygophore oriented to the left. Although left orientation does not commonly occur, a right oriented pygophore is not wholly diagnostic of this species.

Carpintero and Dellapé (2006) correctly highlighted the existence of tibial teeth on *T. peregrinus* and *T. australicus*, stating the presence of three teeth on the fore and mesotibiae. Within Australian populations, the number of teeth is slightly more variable, with four tibial teeth occasionally found on each of these legs. This variability in

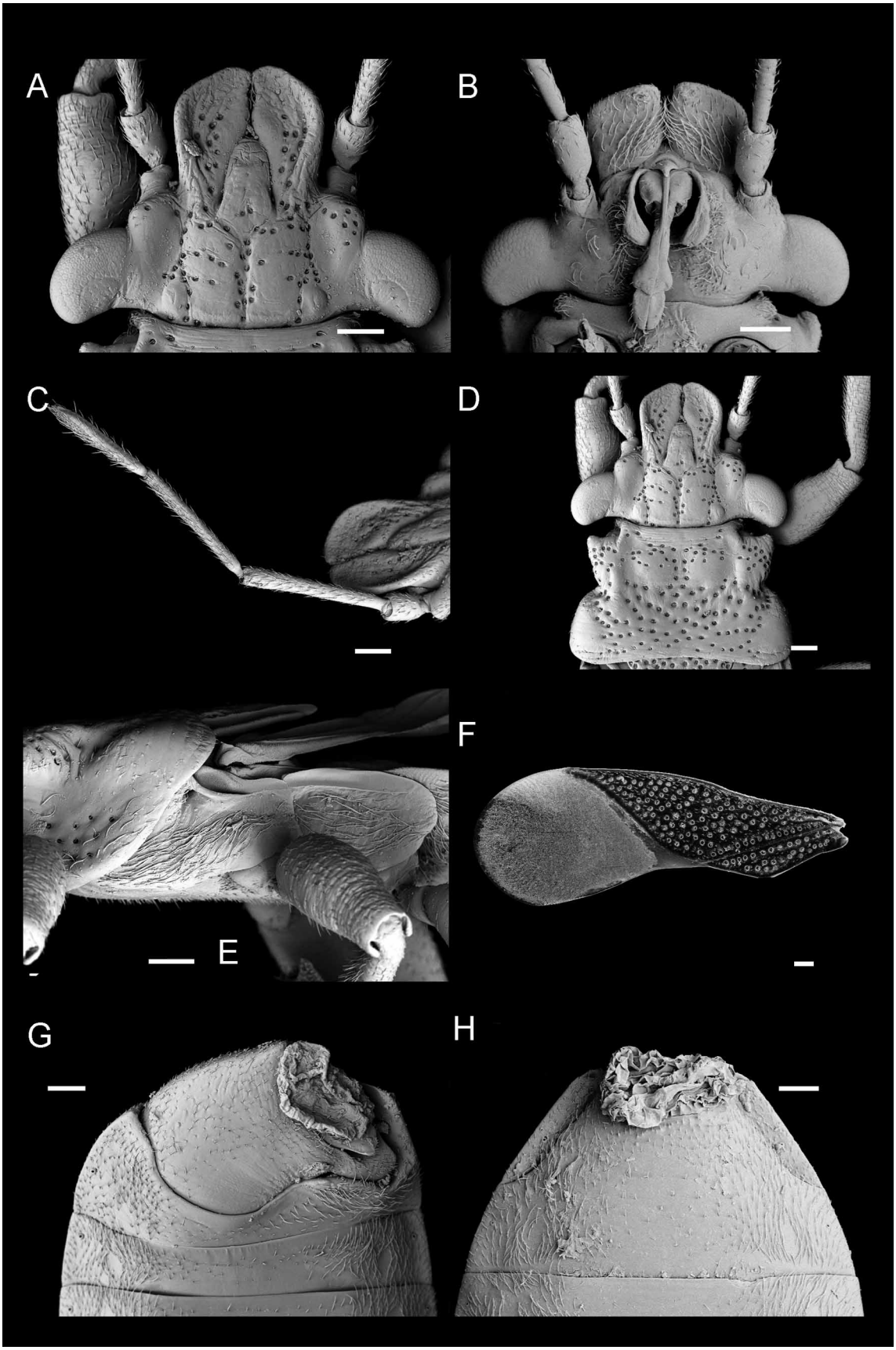

FIGURE 14. Scanning electron micrographs: *Thaumastocoris peregrinus*. **A** ♂ head, dorsal view. **B** ♂ head, ventral view. **C** ♂ antenna, lateral view. D ♂ head and pronotum, dorsal view. **E** ♂ thorax, lateral view. **F** ♂ hemelytra, dorsal view. **G** ♂ genitalia, ventral view. **H** ♀ genitalia, ventral view. Scale bar = 0.1mm.

tibial teeth number is common within species of *Thaumastocoris*, especially among species which have high numbers of tibial teeth; it is a character of limited diagnostic value.

There is colour variation between different populations of Australian *T. peregrinus* and generally the species appears darker than those found in South Africa and South America. However, the population from Cootamundra, New South Wales, has light straw colouration, as in the extralimital populations.

Thaumastocoris petilus Drake and Slater, 1957

(Figures: 7C,D; 15A–G; 19C)

Thaumastocoris petilus Drake and Slater, 1957: 367 (description); Slater 1973: 154 (note); Cassis and Gross 1995: 394 (catalogue); Cassis, Schuh and Brailovsky 1999: 30 (diagnosis; distribution; host plants)

Holotype: ♂, AUSTRALIA, VICTORIA, Kiata, Oct. 1928 F.E. Wilson (USNM).

Other material examined. NORTHERN TERRITORY: 4♂, 4♀, Palm Valley, Finke Gorge National Park, 24°3'37"S 132°44'37"E, 586 m, 11 April 2001, G Cassis, RT Schuh, MD Schwartz, R Silveira and MA Wall, locality code [CA01_L51_H241, ex *Melaleuca glomerata* (AM; UNSW). SOUTH AUSTRALIA: 4♂, 2♀, 18km S of Bews, Ngarkat Conservation Park, 35°33'07"S 140°25'59"E, 60 m, 9 November 1998, RT Schuh, G Cassis and R Silveira, locality code [98-36, ex *Melaleuca uncinata* R. Br. (NSW427353) (AM; UNSW). WESTERN AUSTRALIA: 5♂, 5♀, Brand Highway, 8.2km N of Eneabba,.29°44.771'S 115°15.240'E, 100 m, 31 October 1996, RT Schuh and G Cassis, locality code 96-L46-H137, ex *Melaleuca rhaphiophylla* Schauer (Perth05120195) (AM; UNSW); 1♀, Kalamunda, 31°58'S 116°01'E, 22. April.2008, landed on human, P Murphy (WAAD); 1♂, Moorine Rocks, 11.7 km N Great Eastern Highway on Noongar Road, 345m. 31°13'42"S 118°58'44"E, 4 December 1997, RT Schuh, G Cassis, H Brailovsky, A Asquith, locality code 97-L01, ex *Malleostemon tuberculatus* (AM); 15♂ 15♀ Mosman Park, Perth, 32°01'33"S 115°45'57"E, 7 August 1999, G. Cassis, locality code L2-H8, ex *Melaleuca rhaphiophylla* (AM); 13♂, 8♀, Mosman Park, Perth, 32°1.254'S; 115°46.1215'E, 20 m, 15 November 1999, RT Schuh, G Cassis and R Silveira, locality code WA99-L1-H2, ex *Melaleuca rhaphiophylla* (AM; UNSW); 2♂, 2♀ Ravensthorpe Range, nr river, 33°29'20"S 120°08'01"E, 25 May 2007, ex beat, ML Moir and MC Leng WAM46 (MMPC); 1♀, Swan River, AM Lea (WAAD); 1♂, 4km N of South Coast Highway on lake Magenta road, 360 m, 33°46.7034'S 119°17.3145'E, 29 November 1999, RT Schuh, G Cassis and R Silveira, locality code WA99-L47, ex *Melaleuca* sp. (AM); 1♂, 7.9km N of Ravensthorpe, 400 m, 33°32.175'S 119°59.957'E, 5 November 1996, RT Schuh and G Cassis, locality code WA96-L61-H164, ex *Melaleuca cucullata* Turcz. (Perth05236657) (AM); 18♂, 14♀, 13.4 km N of Peak Charles National Park, 32°47.234'S 121°14.617'E, 275 m 20 November 1999, RT Schuh, G Cassis and R Silveira, locality code WA99-L18-H062, ex *Melaleuca uncinata* R. Br. (Perth05670756) (AM; UNSW); 2♂, 3♀, 13.5 km W of Nungarin on Rt 50, 31°6.928'S 117°56.697'E, 300 m, 16 November 1999, RT Schuh, G Cassis and R Silveira, locality code WA99-L3-H8 (AM); 2♀ 28km S of Menzies (3.5km E of Highway, 500 m, 29°55.149'S 121°09.085'E, 25 October 1996, RT Schuh and G Cassis, locality code WA96-L18, ex *Thryptomene aspera* E.Pritz. subs. *aspera* (Perth05095093) (AM).

Diagnosis. *Thaumastocoris petilus* is readily distinguished from all other species of *Thaumastocoris* by the following characters: slender body, with costal margins subparallel; weakly pedicellate eyes (Figure 7C,D); subcontiguous forecoxae, with prosternum bipartite (Figure 15B); propleuron strongly expanded (Figure 15B); pygophoral lock broadly triangulate; paramere subquadrate (Figure 19C). The species can be distinguished from *T. hackeri*, another species with closely inserted forecoxae, by its weakly pedicellate eyes (cf. Figure 4C,D). The eyes of *T. hackeri* are strongly pedicellate and its forecoxae are separated by approximately half the width of the forecoxae. Furthermore, the abdomen of *T. hackeri* is expanded, and is visible in dorsal view beyond the costal margins.

Redescription. Submacropterous. Male 2.37–2.77 length, 0.74–0.86 width; female 2.45–2.88 length, 0.81–0.92 width; females are slightly larger in size than males. **Colouration**. Dorsum straw-coloured with contrasting cream markings. *Head*: mostly straw-coloured; vertex more yellow; genae with light brown stripe. *Antennae*: mostly yellowish brown; AII with subapical margin dark brown to fuscous; subapical half of AIII and most of AIV dark brown to fuscous (Figure 7C,D). *Labium*: LI–LIII straw-coloured, LIV light brown. *Pronotum*: mostly straw-coloured, pronotal disc cream medially. *Thoracic pleura and sterna*: mostly golden yellow, propleura becoming darker dorsally; prosternum and midline of metasternum cream-coloured. *Scutellum*: uniformly golden

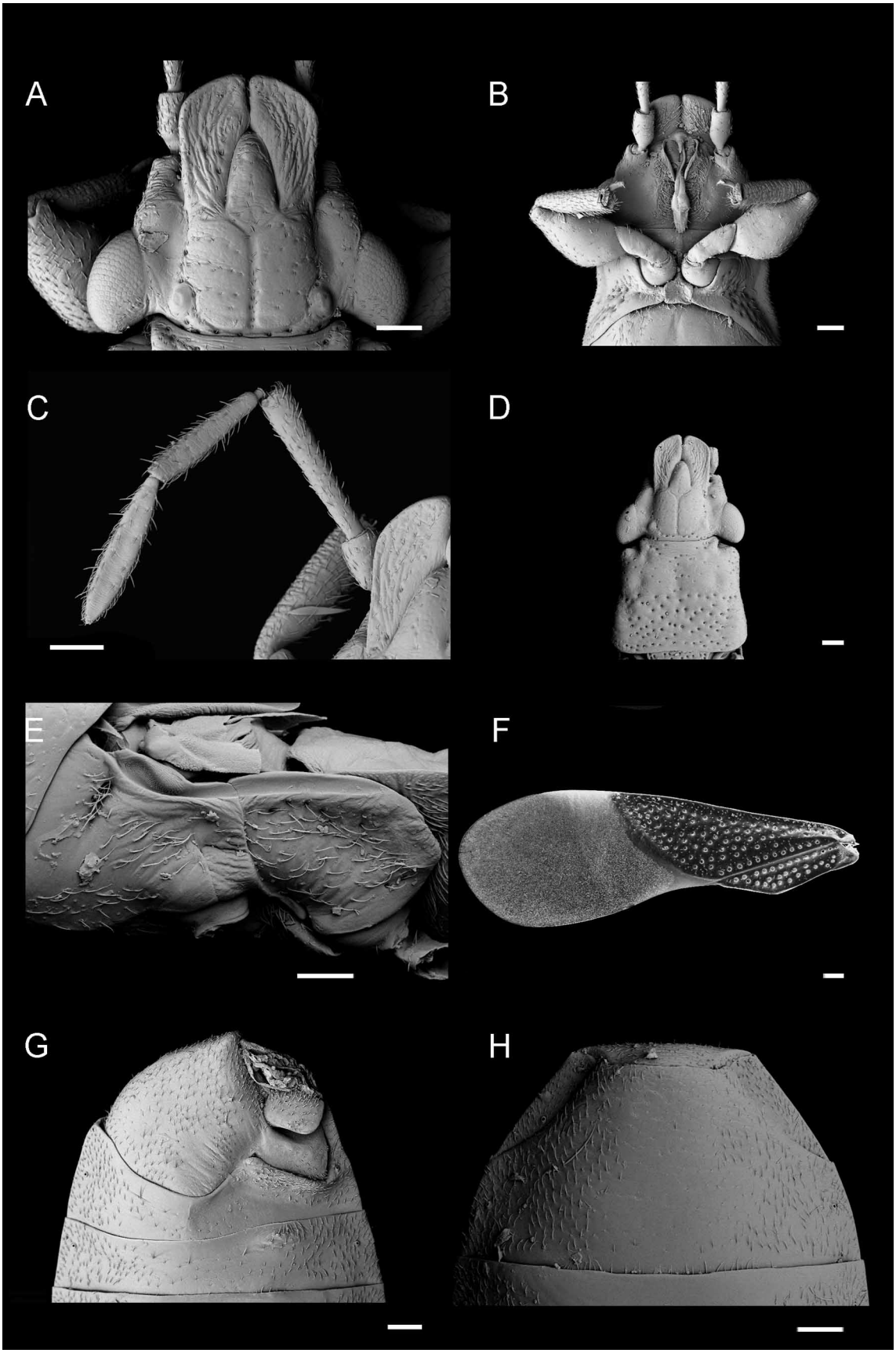

FIGURE 15. Scanning electron micrographs: *Thaumastocoris petilus*. **A** ♂ head, dorsal view. **B** ♂ head and prosternum, ventral view. **C** ♂ antenna, dorsal view. **D** ♂ head and pronotum, dorsal view. **E** ♂ thorax, lateral view. F ♂ Hemelytra, dorsal view. **G** ♂ genitalia, ventral view. **H** ♀ genitalia, ventral view. Scale bar = 0.1mm.

yellow. *Hemelytra*: mostly cream-coloured; membrane lighter, medially infused with light brown (Figure 7C,D). *Legs*: uniformly straw-coloured, with second tarsomere dark brown. *Abdomen*: uniformly golden yellow, slightly darker medially. **Texture**. Dorsum moderately polished, with scattered shallow to deep setose punctures. *Head*: vertex impunctate; epicranial suture with shallow irregular punctures; mandibular plates irregularly punctate, denser posteriorly, punctures shallow (Figure 15A). *Pronotum*: callosite region sparsely punctate, punctures shallow, denser along midline and anterolateral angles; disc densely and regularly punctate, punctures deep, posterolateral angles impunctate (Figure 15B). *Thoracic pleura and sterna*: propleuron with irregular distribution of shallow punctures apically, moderately dense and uniform distribution of punctures posteriorly; thoracic sterna mostly with sparse and irregular distribution of punctures. *Scutellum*: densely and regularly punctate, punctures moderately deep, midline polished posteriorly. *Hemelytra*: clavus and corium with uniform and moderate distribution of deep punctures, as on pronotal disc (Figure 7C,D). *Abdomen*: impunctate, moderately polished. **Vestiture**. Dorsum with uniform distribution of setose punctures, setae short, straw-coloured. Venter with uniform distribution of fine, straw-coloured, erect setae; mesosternum with irregular distribution of setae medially, sparse laterally. *Antennae*: with uniform distribution of short erect setae; AIII–AIV with same setae on lateral margins, otherwise bare (Figure 15C). *Male genitalia*: pygophore clothed in fine setae, more elongate and denser near genital opening; pygophoral lock with denser setae medially; paramere evenly beset with setae, sparse apically (Figure 19C). **Structure.** *Head*: mandibular plates elongate, surpassing clypeus by less than clypeal length, contiguous medially, weak to moderately flared anteriorly, weakly concave dorsally with lateral margins parallel to weakly flared (Figure 15A); buccullae, strongly arcuate (Figure 15B). *Eyes*: weakly pedicellate (Figure 7C,D; 15A,D). *Antennae*: AI and AII cylindrical; AIII and AIV dorsoventrally flattened; AII distally expanded; AIV moderately lanceolate (Figure 15C). *Labium*: short, reaching anterior margin of prosternum (Figure 15B). *Pronotum*: weakly constricted medially; callosite region and disc subequal in length, disc broader; callosite region depressed along midline; anterolateral angles weakly tuberculate; lateral margin of disc weakly arcuate (Figure 15D). *Thoracic pleura and sterna*: propleuron strongly ventrally expanded, approaching midline of body (Figure 15B); other pleura weakly ventrally expanded; prosternum bipartite, shieldlike posteriorly, subcordiform (Figure 15B). *Hemelytra*: at rest extending to abdominal TIX, medial margin of corium convex, apex of corium at membrane moderately narrowed, medial margin less than 45° to costal margin (Figure 7C,D). *Legs*: forecoxae subcontiguous, strongly incrassate (Figure 15B); fossula spongiosa elongate, reaching distal margin of second tarsomere; 6–9 foretibial teeth, 5–8 midtibial teeth, 0–2 hindtibial teeth. *Male Genitalia*: pygophoral lock broadly triangulate, weakly excavate medially; paramere subquadrate (Figure 19C).

Measurements. See Table 2.

Distribution. *Thaumastocoris petilus* is broadly distributed in temperate Australia, with one record from central Australia (Figure 21A). Overall, this species appears to be adapted to drier conditions (Cassis *et al*, 1999).

Host plants. *Thaumastocoris petilus* has been collected from six host species representing three genera from the family Myrtaceae. It is most commonly recorded from species of *Melaleuca* (Table 3). It is a narrow species, and it is cryptozoic on the thin, needle-like leaves of their *Melaleuca* hosts (Figure 2A).

Remarks. Cassis *et al.* (1999) were reluctant to assign new material to this species, urging caution until the type was examined. We have examined the holotype of *Thaumastocoris petilus* and it is in very poor condition. There is no doubt that it is conspecific with the material examined in this work, particularly on the basis of the pygophore and paramere. Drake and Slater (1957) did not mention the subcontiguous forecoxal insertion in their description, but it is undoubtedly the most striking character of *T. petilus*. The range in measurements recorded by Drake and Slater (1957) is similar to the range measured in this study, although specimens from Western Australia are smaller than those collected elsewhere.

Thaumastocoris roy Noack, Cassis & Rose n.sp.

(Figures: 8A,B; 19D)

Etymology. This species is named in honour Roy Frederick Noack, father of the first author, who passed away before the completion of this project.

Holotype: ♂, QUEENSLAND: Mt Glorious, 27°19'S 152°45'E, Y Basset site, 700m, II 1988, Y. Basset, ex *Argyrodendron actinophyllum*, 6091, T169567 (QM). Paratypes: 1♂ West Normanby R., 40 ml W of Cooktown, 12 xi 1965, G Monteith T169570 (QM); 2♀ same data as holotype T169568, T169569 (QM).

Diagnosis. *Thaumastocoris roy* is distinguished by the following combination of characters: body with dense distribution of setae; mandibular plates moderately expanded laterally; strongly pedicellate eyes; elongate labium, reaching posterior margin of prosternum; expanded abdomen, visible from above (Figure 8A,B); paramere keeled (Figure 19D). This species can be distinguished from *T. hackeri* by the paramere and the proximity of forecoxae to each other. The paramere of *T. hackeri* is hornlike apically and not keeled (cf. Figure 18E,F). The forecoxae are inserted at a distance less than the forecoxal width, whereas in *T. roy* they are inserted at a distance equal to or slightly more than coxal width. *Thaumastocoris roy* is also much smaller than *T. hackeri*.

Description. Submacropterous. Male length 2.37–2.41, width 0.96–0.98; female length 2.57–2.69, width 0.98–0.98. Females darker in colouration, slightly larger in size, with the abdomen more expanded (Figure 8B). **Colouration**. Dorsum yellowish brown with contrasting dark brown to fuscous markings (Figure 8A,B). *Head*: mostly yellowish brown; vertex medium brown; genae with fuscous area medially; genae, gula and bucculae light brown. *Antennae*: mostly light brown; AII with subapical margin dark brown; subapical third of AIII and apical two-thirds of AIV dark brown to fuscous. *Labium*: LI–LIII straw-coloured; LIV fuscous. *Pronotum*: mostly yellowish brown; pronotal disc yellowish cream medially, posterior margin dark brown. *Thoracic pleura and sterna*: proepisternum yellowish brown; proepimeron dark brown posteriorly; prosternum fuscous. *Scutellum*: dark brown anteriorly, posterior half of midline straw-coloured. *Hemelytra*: yellowish brown, with clavus more cream-coloured; membrane cream, medially infused with brown (Figure 8A,B). *Legs*: mostly yellowish brown, second tarsomere light brown. *Abdomen*: mostly dark brown, fuscous medially. **Texture**. Dorsum moderately polished, with shallow to deep setose punctures. *Head*: vertex mostly impunctate, with transverse puncticulate rows sometimes visible; epicranial suture with irregular distribution of shallow to moderately deep punctures; mandibular plates irregularly punctate, denser posteriorly, punctures shallow. *Pronotum*: callosite region irregularly punctate, punctures shallow, denser along midline and anterolateral angles; pronotal disc densely and regularly punctate, punctures deep, posterior margin and posterolateral angles impunctate (Figure 8A,B). *Thoracic pleura and sterna*: pleura with regular distribution of shallow punctures; prosternum finely reticulate medially; mesosternum strongly polished medially. *Scutellum*: densely and regularly punctate, punctures deep, midline polished posteriorly. *Hemelytra*: clavus and corium with uniform and moderate distribution of deep punctures, larger than on pronotal disc (Figure 8A,B). *Abdomen*: impunctate, moderately polished. **Vestiture**. Dorsum with uniform distribution of setose punctures, setae short, erect, straw-coloured. Lateral aspects of body with elongate, shiny, straw-coloured, decumbent setae. Ventral aspects of body with short sparse setae. *Antennae*: AII–AIII with uniform distribution of decumbent setae, intermixed with fine, erect setae; AIV with same setae on lateral margins, otherwise bare. *Male genitalia*: pygophore with sparse distribution of fine setae; pygophoral lock with larger, denser setae medially; paramere with setae along margins, denser posteriorly, medially and apically bare (Figure 19D). **Structure.** *Head*: mandibular plates elongate, surpassing clypeus by less than clypeal length, contiguous medially, moderately flared anteriorly, weakly concave dorsally, lateral margins weakly recurved; bucculae arcuate. *Eyes*: strongly pedicellate (Figure 8A,B). *Antennae*: AI and AIII cylindrical; AII slightly distally expanded, AIV weakly dorsoventrally flattened. *Labium*: long, attaining posterior margin of prosternum. *Pronotum*: weakly constricted medially; callosite region shorter than disc, disc broader; anterolateral angles weakly tuberculate; lateral margins of disc weakly arcuate; disc slightly raised above callosite region. *Thoracic sterna*: prosternum concave medially. *Hemelytra*: extending to submarginal abdominal TIX at rest; corium expanded beyond claval commissure; medial margin of corium straight to weakly excavate distally; apex of corium at membrane narrowed, inner margin more than 45° to costal margin; (Figure 8A,B). *Legs*: forecoxal separation subequal to or slightly wider than coxal width; fore and mesofemora incrassate; fossula spongiosa short, not reaching distal half of second tarsomere; 12–13 foretibial teeth, 12–13 mesotibial, 5–6 metatibial teeth. *Male Genitalia*: pygophoral lock moderately long, tapering to gently rounded apex; paramere with large, broad keel (Figure 19D).

Measurements. See Table 2.

Distribution. *Thaumastocoris roy* is restricted to the tropical northeast coast of Queensland, from two widely separated localities (Figure 21B).

Host plant. *Thaumastocoris roy* has only been recorded from *Argyrodendron actinophyllum*, a large rainforest tree native to eastern Australia (Table 3).

***Thaumastocoris safordi* Noack, Cassis & Rose n.sp.**
(Figures: 8C,D; 16A–H; 19E)

Etymology. This species is named in honour of John Saford, Sydney Olympic Park Authority, for his generous support of *Thaumastocoris* research.

Holotype: ♂, NEW SOUTH WALES: Sydney Olympic Park, Homebush. Showgrounds area, 33°50'54"S 151°04'02"E, 29 June 1999, ex *Eucalyptus maculata*, 55895, UWS, IPM unit (AM). Paratypes: 1♂, 2♀ same data as holotype (AM; UNSW); 2♂, 1♀ Sydney Olympic Park, Homebush, b/w showground and flame site, 33°50'56"S 151°03'54"S, 17 August 2001, HA Rose and AE Noack, ex *Corymbia maculata* (AM; UNSW); 1♂ Sydney Olympic Park, Homebush, nr discus monument, 33°51' 05"S 151°03'50"E, 21st Sept 2001, AE Noack, ex *Corymbia citriodora* (AM); 1♀ Sydney Olympic Park, Homebush nr showgrounds, 33°50'54"S 151°04'02"E, 21 September 2001, AE Noack, ex *Corymbia maculata* (AM); 1♂, 1♀, Cromer, 22 February 1989, EE Taylor, ex *Eucalyptus nicholii* (AM); 1♂, 1♀, Sydney, North Epping, 20 July 1988, R Meys, ex *Eucalyptus maculata* (AM); 1♂, Sydney Jackie's Café, corner Liverpool and Sussex St, 21 June 1995, G Cassis (AM); 2♂, 1♀, Sydney Olympic Park, Homebush, nr discus monument, 33°51'05"S 151°03'50"E, 21 September 2001, AE Noack, ex *Corymbia citriodora* (AM); 1♂, 3♀, Sydney Holsworthy Public Primary School, 33°57'04"S 151°03'58"E, 20 September 2001, AE Noack, ex *Corymbia maculata* (AM; UNSW). 1♀, Shoalhaven State Forest, Nowra, 34°53'52S 150°34'20E, 31 May 2001, NR Andrew, ex *Acacia falcata* (NAPC); 1♂, Shoalhaven State Forest, Nowra, 34°53'52S 150°34'20E, 8 August 2001, NR Andrew, ex *Acacia falcata* (NAPC). QUEENSLAND: 1♂ , Brisbane, 6 April 1963, C Speed (QM); 1♂, 3♀, Mulgowie, 8 September 1981, MD Peart, open forest, ex *Eucalyptus maculata*, B425, (QM); 2♂, Murgon, 26°04.720'S 151°54.111'E, R Nadel, 20 May 2008, ex *Corymbia variegata* (AM); 6♂, 6♀, Silver plantation, 26°30.049'S 151°49.900'E, R Nadel, 20 May 2008, ex *Corymbia variegata*. (AM); 2♂, 6♀, Cobbs Hill plantation, nr Murgon 26°04.720"S 151°54.111"E, 13 August 2004, AE Noack, ex *Corymbia variegata* (AM); 3♂, 1♀, Cobbs Hill plantation, nr Murgon, 26°04.720"S 151° 54.111"E, 14 September 2005, AE Noack, ex *Corymbia variegata* (AM).

Diagnosis. *Thaumastocoris safordi* can be recognised by the following characters: slender body, costal margins subparallel (Figure 8C,D); distinctive tubercle on anterolateral angle of pronotum (Figure 16E); pygophoral lock basally invaginated; paramere apically recurved (Figure 19E). It can be distinguished from *T. slateri*, which also has the distinctive tubercle on the pronotum, by the male genitalia (cf. Figure 19F); the pygophoral lock of *T. slateri* is not invaginated basally but weakly flared; and the paramere of *T. slateri* is flat and not recurved apically as in *T. safordi*. Furthermore, these two species differ in their body shape: *T safordi* having a slender subparallel body shape and the abdomen of *T. slateri* is laterally expanded beyond the costal margins, which is visible from above (cf. Figure 9A,B). In addition, *T. safordi* is smaller and more polished than *T. slateri*.

Description. Submacropterous. Male length 2.41–2.65, width 0.71–0.77; female length 2.41–2.69, width 0.86–0.98. **Colouration**. Dorsum yellowish brown with contrasting straw-coloured to dark brown markings (Figure 8C,D). *Head*: mostly yellowish cream; vertex and clypeus darker; lateral aspect of mandibular plates and genae with light brown stripe; genae, gula and bucculae straw-coloured. *Antennae*: mostly straw-coloured; subapical half of AIII and apical two-thirds AIV dark brown to fuscous. *Labium*: LI–LIII straw-coloured; LIV laterally and apically dark brown. *Pronotum*: mostly yellowish brown; pronotal disc cream-coloured medially (Figure 8C,D). *Thoracic pleura and sterna*: mostly straw-coloured; propleura lighter ventrally; mesosternum yellowish brown to dark brown. *Scutellum*: dark brown anteriorly, posterior half of midline straw-coloured. *Hemelytra*: mostly yellowish brown; clavus more cream-coloured; corium darker medially; membrane cream, distal half infused with dark brown (Figure 8C,D). *Legs*: mostly straw-coloured, with distal two-thirds of second tarsomere dark brown. *Abdomen*: uniformly yellowish brown. **Texture**. Dorsum polished, with scattered shallow to deep setose punctures. *Head*: vertex mostly impunctate, polished, with transverse puncticulate rows sometimes visible, punctures shallow; epicranial suture with shallow to moderately deep irregular punctures; mandibular plates with sparse irregular punctation, denser posteriorly, punctures shallow, sometimes obscure (Figure 16A). *Pronotum*: callosite region polished, mostly impunctate, sparse shallow punctation on anterolateral angles, denser along midline; pronotal disc densely and regularly punctate, punctures deep, posterolateral angles impunctate (Figure 16E). *Thoracic pleura and sterna*: propleuron with dorsoposterior area of fine punctures submarginally; metapleura marked by single row of fine punctures dorsoposteriorly (Figure 16F); thoracic sterna impunctate, mesosternum strongly polished medially. *Scutellum*: densely and regularly punctate, punctures deep and fine, midline polished posteriorly. *Hemelytra*:

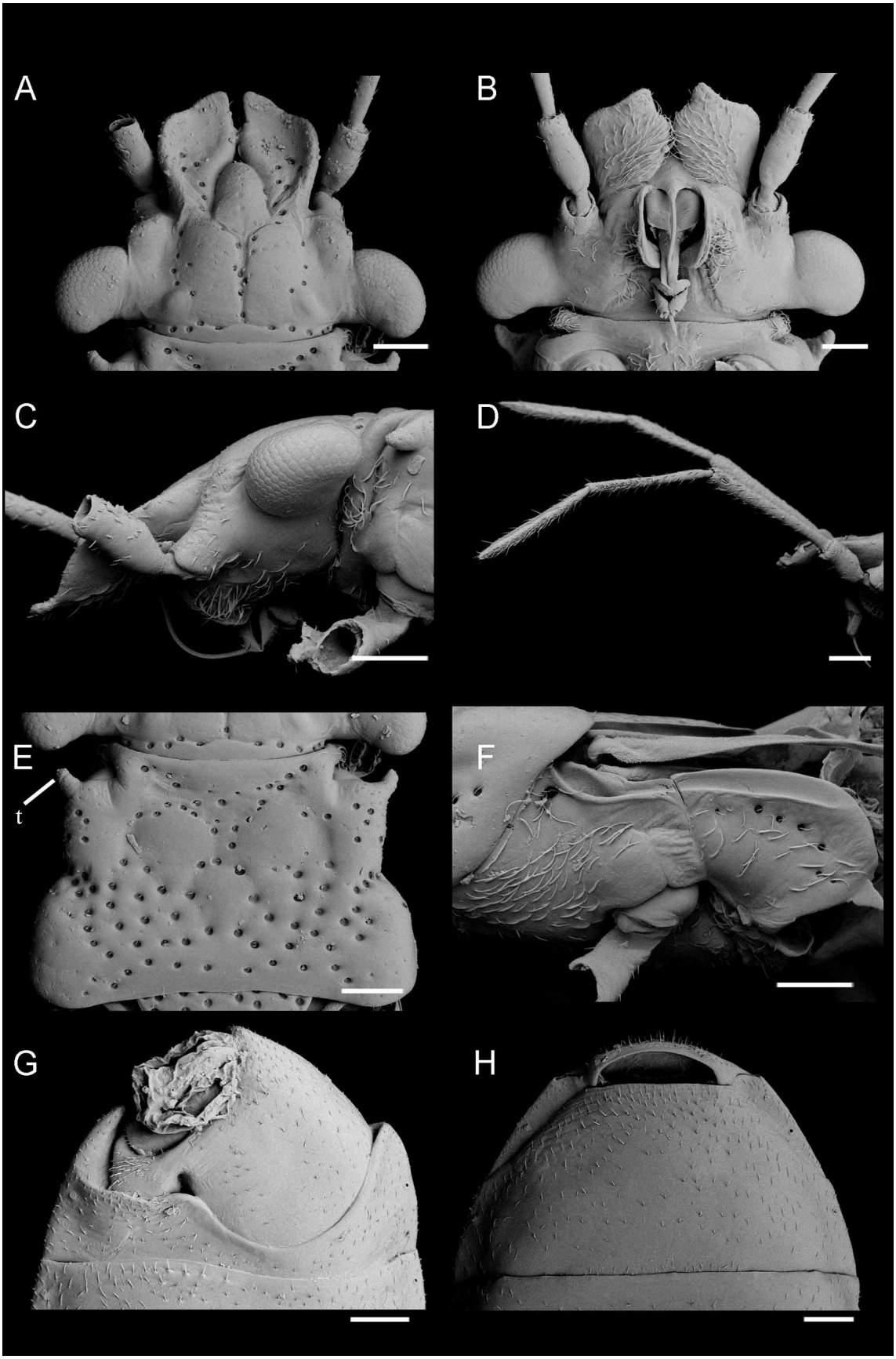

FIGURE 16. Scanning electron micrographs: *Thaumastocoris safordi*. **A** ♂ head, dorsal view. **B** ♂ head, ventral view. **C** ♂ head, lateral view. **D** ♂ antenna, lateral view. **E** ♂ pronotum, dorsal view. **F** ♂ thorax, lateral view. **G** ♂ genitalia, ventral view. **H** ♀ genitalia, ventral view. t = tubercle. Scale bar = 0.1mm.

clavus and corium with uniform and moderate distribution of deep punctures, as on pronotal disc (Figure 8C,D). *Abdomen*: impunctate, highly polished. **Vestiture**. Dorsum with uniform distribution of setose punctures, setae short, erect, straw-coloured. Lateral and ventral aspects of body, with irregular distribution of elongate, straw-coloured, decumbent setae (Figure 16F), most densely distributed on ventral mandibular plates, adjacent to bucculae (Figure 16B), prosternum and medial mesopleura. *Antennae*: uniform distribution of decumbent setae intermixed with fine erect setae; AIII–AIV with same setae on lateral margins, otherwise bare (Figure 16D). *Male genitalia:* pygophore with sparse fine setae; pygophoral lock with area of dense setae medially; paramere with sparse irregular setae, denser medially (Figure 19E). **Structure.** *Head*: mandibular plates elongate, surpassing clypeus by more than clypeal length, just touching to completely contiguous medially, flared anteriorly, moderately to strongly concave dorsally, lateral margins strongly recurved (Figure 16A); bucculae strongly arcuate, weakly explanate posteriorly (Figure 16B). *Eyes*: moderately pedicellate. *Antennae*: AI and AII cylindrical, AIII and AIV dorsoventrally compressed; AII slightly expanded distally; AIV weakly lanceolate (Figure 16D). *Labium*: short, reaching anterior margin of prosternum (Figure 16B). *Pronotum*: strongly constricted medially; callosite region and disc subequal in length, disc a little broader; callosite region strongly depressed along midline; anterolateral angle with distinctive tubercle (Figure 16E); lateral margins of disc weakly arcuate. *Thoracic sterna*: prosternum weakly swollen anteromedially. *Hemelytra*: at rest extending to basal third of pygophore; medial margin of corium weakly excavate distally; apex of corium at membrane moderately narrowed, medial margin less than 45° to costal margin (Figure 8C,D). *Legs*: forecoxal separation subequal to slightly wider than coxal width; fore and mesofemora incrassate; fossula spongiosa elongate, reaching distal margin of second tarsomere; 3 foretibial teeth, 3–4 mesotibial teeth, without metatibial teeth. *Male Genitalia*: pygophoral lock subquadrate, concave apically, invaginated basally; paramere subrectangular, recurved apically (Figure 19E).

Measurements. See Table 2.

Distribution. *Thaumastocoris safordi* is known from eastern Australia, with a significant distributional disjunction between the Sydney Basin and southeast Queensland (Figure 21B).

Host plants. *Thaumastocoris safordi* has relatively broad host range and is known from three species of *Corymbia*, and a single species each of *Eucalyptus* and *Acacia* (Table 3). *Thaumastocoris safordi* was collected from much of the Sydney basin in small numbers on *C. citriodora* and C. *maculata* during a survey to ascertain the extent of *T. peregrinus* infestation in 2002 (Noack 2009). Concurrently, in south east Queensland, this species was heavily infesting plantations of *C. variegata* (Lawson *et al* 2010) (Figure 1B).

Remarks. *Thaumastocoris safordi* has increased in numbers since being first collected in 2002 (Noack 2009), and now many *Corymbia* spp. street trees planted in the Sydney basin are displaying the yellowish faded green colouration of infestation (AEN, personal observation). Noack and Rose (2007) have studied its life-history in the laboratory.

Thaumastocoris slateri Noack, Cassis & Rose n.sp.

(Figures: 9A,B; 17A–H; 19F)

Etymology. This species is named in honour of the late Professor James A Slater, who has been one of the most significant heteropterists of all time, had a special interest in Australian true bugs, and published significant works on the Thaumastocoridae.

Holotype: ♂, QUEENSLAND: St Lucia, university of Queensland campus, nr city cat dock, 27.4938S 153.0166E, 10 July 2004, HA Rose, ex *Corymbia variegata* (AM). Paratypes: 1♂ 3♀, same locality data as holotype, 22 August 2004, AE Noack, ex *Corymbia variegata* (AM; UNSW); 4♀, same locality data as holotype, 19 August 2004, AE Noack, ex *Corymbia variegata* (AM; UNSW).

Diagnosis. *Thaumastocoris slateri* can be distinguished by the following combination of characters: body large; eyes strongly pedicellate; anterolateral angle of pronotum with conspicuous tubercle; abdomen expanded beyond costal margins of hemelytra (Figure 9A,B). This species can be distinguished from *T. safordi*, which also has a distinctive pronotal tubercle, by its expanded abdomen and pygophore. *Thaumastocoris safordi* is quite slender, having a subparallel body shape, and the abdomen not expanded (cf. Figure 8C,D). In addition, the pygophoral lock of *T. slateri* is elongate and weakly concave apically (Figure 19F), whereas in *T. safordi* the lock is stout and strongly concave apically (cf. Figure 19E). Further, the hemelytra of *T. slateri* are relatively short, not reaching the genital capsule, whereas the hemelytra of *T. safordi* cover almost the entire dorsum.

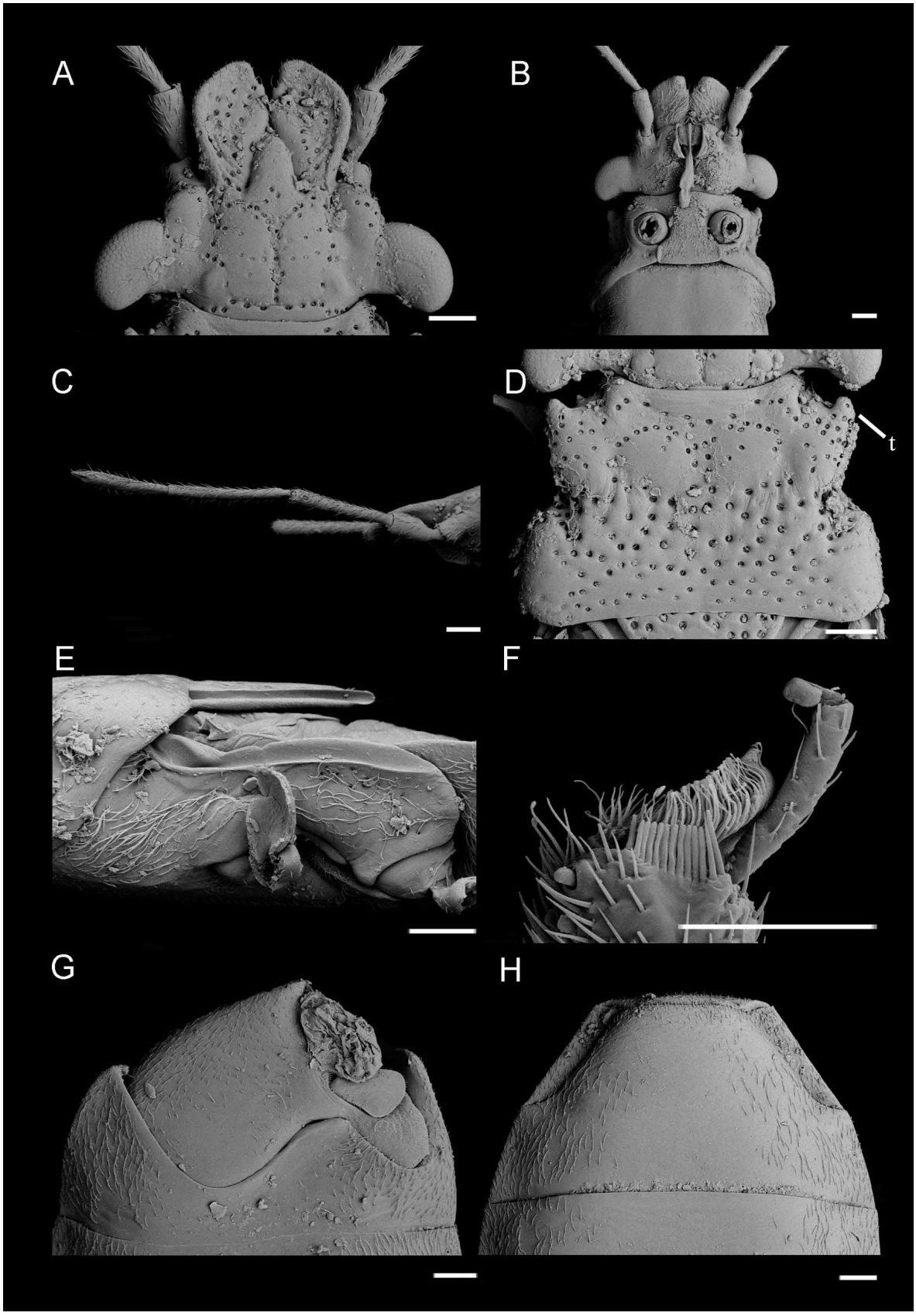

FIGURE 17. Scanning electron micrographs: *Thaumastocoris slateri*. **A** ♂ head, dorsal view. **B** ♂ head and prosternum, ventral view. **C** ♂ antenna, lateral view. **D** ♂ pronotum, dorsal view. **E** ♂ thorax, lateral view. **F** ♂ foretarsus, lateral view. **G** ♂ genitalia, ventral view. **H** ♀ genitalia, ventral view. t = tubercle. Scale bar = 0.1mm.

Description. Submacropterous. Male length 3.08–3.20, width 0.98–1.05; female length 2.96–3.16, width 0.84–1.11. Females are darker in colouration, abdomen more expanded. **Colouration**. Dorsum straw to golden yellow with contrasting dark brown to fuscous markings. *Head*: mostly straw-coloured to golden yellow; vertex and clypeus golden yellow (Figure 9A,B); lateral aspect of mandibular plates and genae with fuscous stripe; genae, gula and bucculae straw-coloured. *Antennae*: mostly straw-coloured; subapical third of AIII and apical half of AIV dark brown to fuscous. *Labium*: LI–LIII straw-coloured; apex of LIV dark brown. *Pronotum*: mostly golden yellow, pronotal disc cream-coloured medially. *Thoracic pleura and sterna*: mostly golden yellow; propleura golden yellow, cream ventrally; prosternum straw. *Scutellum*: golden yellow anteriorly, posterior half of midline straw-coloured. *Hemelytra*: yellowish cream, with clavus more cream; membrane cream-coloured, medially infused with light brown (Figure 9A,B). *Legs*: mostly straw-coloured, distal half of second tarsomere dark brown. *Abdomen*: uniformly golden yellow. **Texture**. Dorsum moderately polished, with scattered shallow to deep setose punctures. *Head*: vertex mostly impunctate, with transverse puncticulate rows sometimes visible, punctures shallow; epicranial suture with irregular distribution of shallow to moderately deep punctures; mandibular plates irregularly punctate, denser posteriorly, punctures shallow (Figure 17A). *Pronotum*: callosite region polished, sparsely punctate, punctures shallow, denser along midline and anterolateral angles; disc densely and regularly punctate, punctures deep, posterolateral angles impunctate (Figure 17D). *Thoracic pleura and sterna*: dorsoposterior area of propleuron with fine punctures submarginally; metapleural suture marked by single row of fine punctures (Figure 17E); thoracic sterna impunctate, mesosternum strongly polished medially. *Scutellum*: densely and regularly punctate, punctures deep, midline polished posteriorly. *Hemelytra*: clavus and corium with uniform and moderate distribution of deep punctures, as on pronotal disc (Figure 9A,B). *Abdomen*: impunctate, moderately polished. **Vestiture**. Dorsum with uniform distribution of setose punctures, setae short erect straw-coloured. Lateral and ventral aspects of body, with elongate, straw-coloured, decumbent setae, most densely distributed on ventral mandibular plates, gula and prosternum (Figure 17B); mesosternum with irregular distribution of setae, sparse medially. *Antennae*: uniform distribution of decumbent setae intermixed with fine, erect setae; AIII–AIV with similar setae on lateral margins, otherwise bare (Figure 17C). *Male genitalia*: pygophore clothed in fine seta; pygophoral lock covered with fine setae, longer and thicker medially; paramere beset with irregular setae, denser medially, sparse apically (Figure 19F). **Structure.** *Head*: mandibular plates elongate, surpassing clypeus by more than clypeal length, contiguous posteromedially, flared anteriorly, moderate to strongly concave dorsally, lateral margins strongly recurved (Figure 17A); bucculae strongly arcuate, explanate posteriorly (Figure 17B); gula weakly excavate. *Eyes*: moderately pedicellate. *Antennae*: AI and AII cylindrical; AII slightly expanded distally; AIV weakly lanceolate. *Labium*: short, reaching anterior margin of prosternum (Figure 17B). *Pronotum*: Strongly constricted medially; callosite region and disc subequal in length, disc a little broader; callosite region depressed along midline; anterolateral angles with distinctive tubercle; lateral margins of disc weakly arcuate (Figure 17D). *Thoracic sterna*: prosternum weakly swollen anteromedially. *Hemelytra*: at rest extending to abdominal TIX; medial margin of corium straight to weakly excavate; apex of corium at membrane weakly narrowed, inner margin less than 45° to costal margin (Figure 9A,B). *Legs*: forecoxal separation subequal to slightly wider than coxal width; fore and mesofemora weakly incrassate; fossula spongiosa elongate, reaching distal half of second tarsomere (Figure 17F); 3–4 foretibial teeth, 2–3 mesotibial teeth, without metatibial teeth. *Male Genitalia*: pygophore elliptical; pygophoral lock broad basally, elongated and concave apically; paramere ovate (Figure 17G; 19F).

Measurements. Table 2

Distribution. *Thaumastocoris slateri* is only known from the type locality (Figure 21B), on the University of Queensland campus in suburban Brisbane.

Host plant. *Thaumastocoris slateri* is known only from *Corymbia citriodora* ssp. *variegata* (Table 3), having been collected from the University of Queensland campus, along the river shore.

Remarks. *Thaumastocoris slateri* is the largest species in the genus.

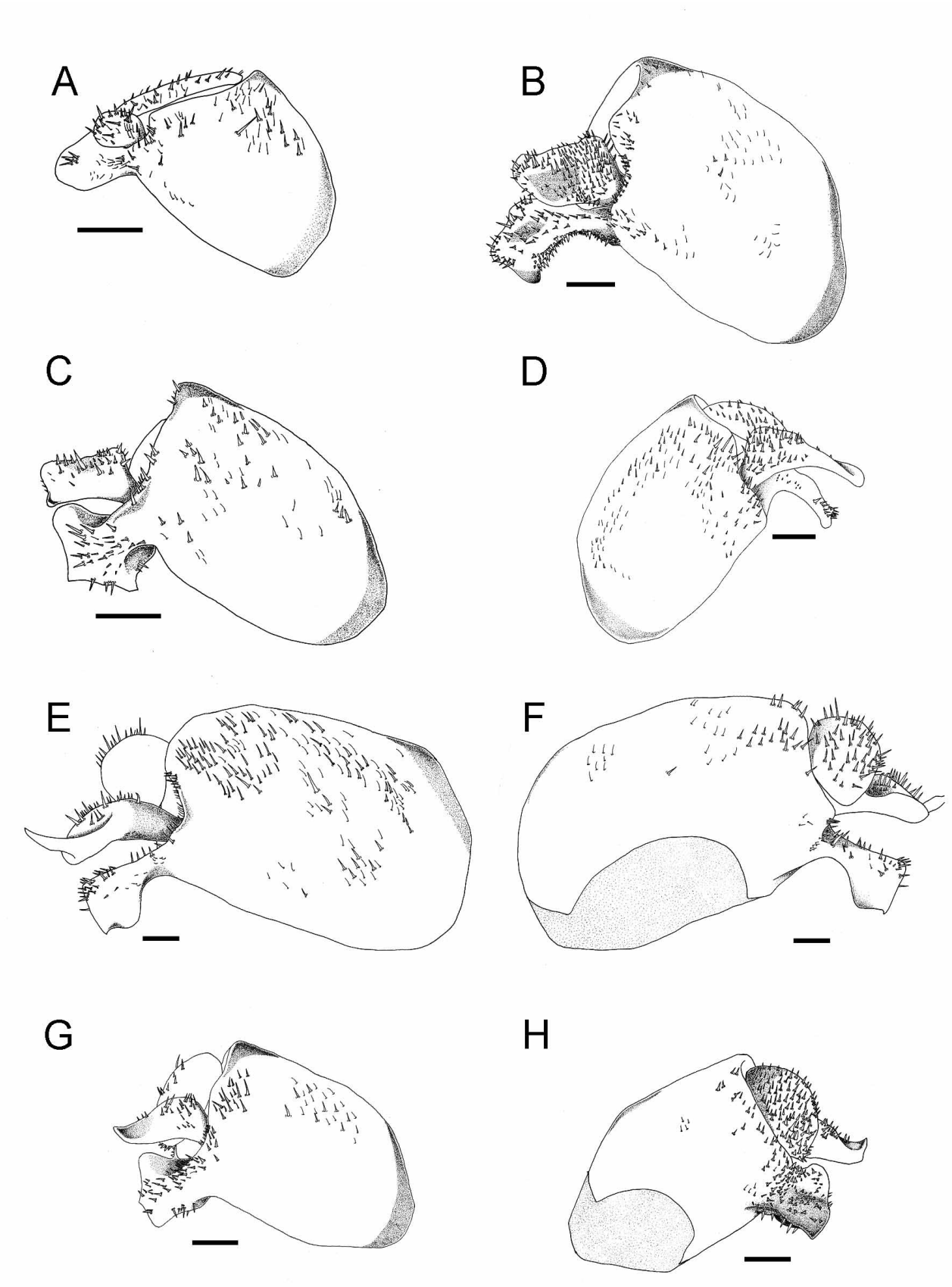

FIGURE 18. Male genitalia. **A.** *Thaumastocoris australicus*, ventral view **B.** *Thaumastocoris busso*, ventral view **C.** *Thaumastocoris freomooreae*, ventral view **D.** *Thaumastocoris majeri*, ventral view **E.** *Thaumastocoris hackeri*, ventral view **F.** *Thaumastocoris hackeri*, dorsal view **G.** *Thaumastocoris ohallorani*, ventral view **H.** *Thaumastocoris ohallorani*, dorsal view. Scale bar = 0.1mm.

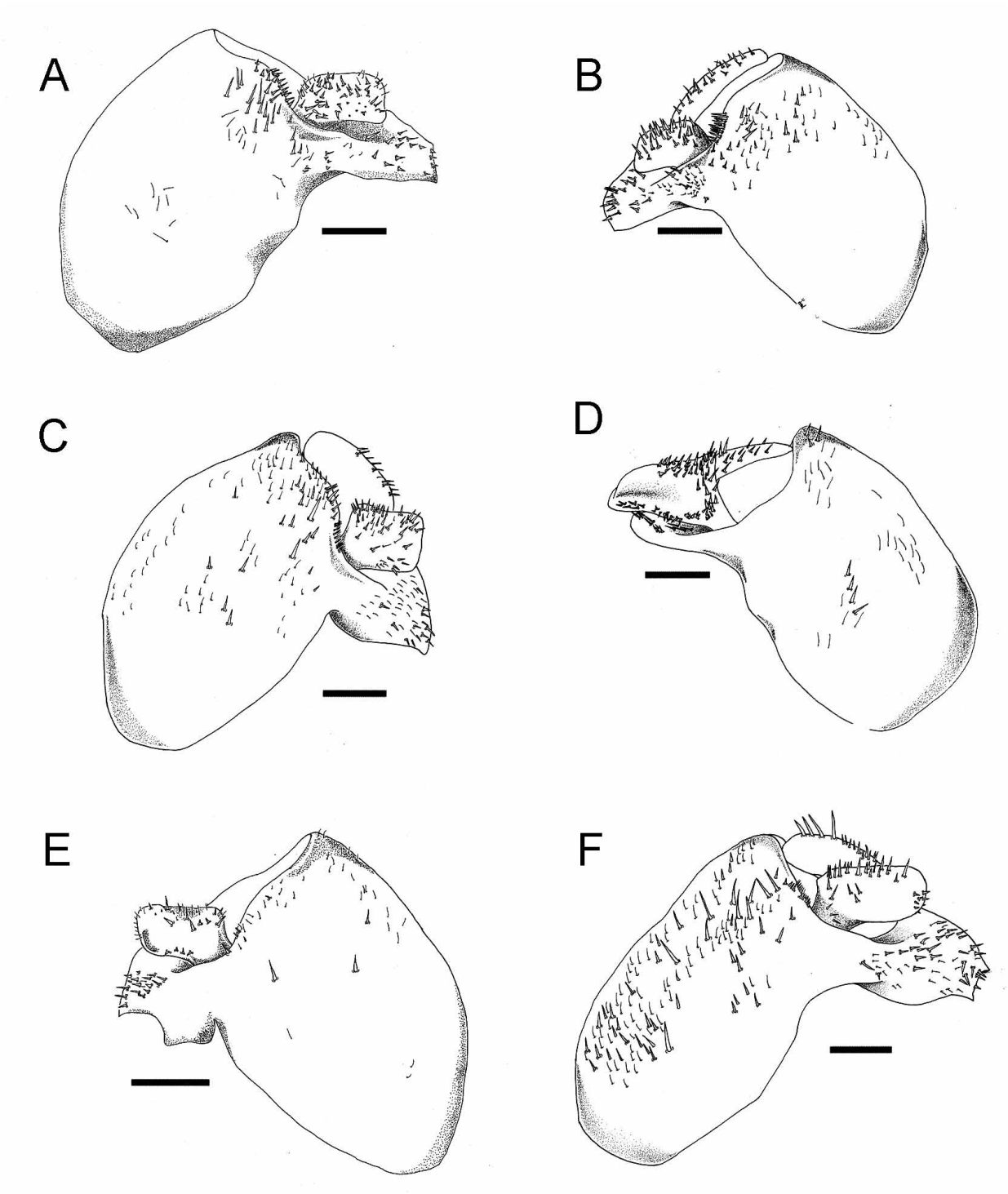

FIGURE 19. Male genitalia. **A.** *Thaumastocoris nadeli*, ventral view. **B.** *Thaumastocoris peregrinus*, ventral view **C.** *Thaumastocoris petilus*, ventral view **D.** *Thaumastocoris roy*, ventral view **E.** *Thaumastocoris safordi*, ventral view **F.** *Thaumastocoris slateri*, ventral view. Scale bar = 0.1mm.

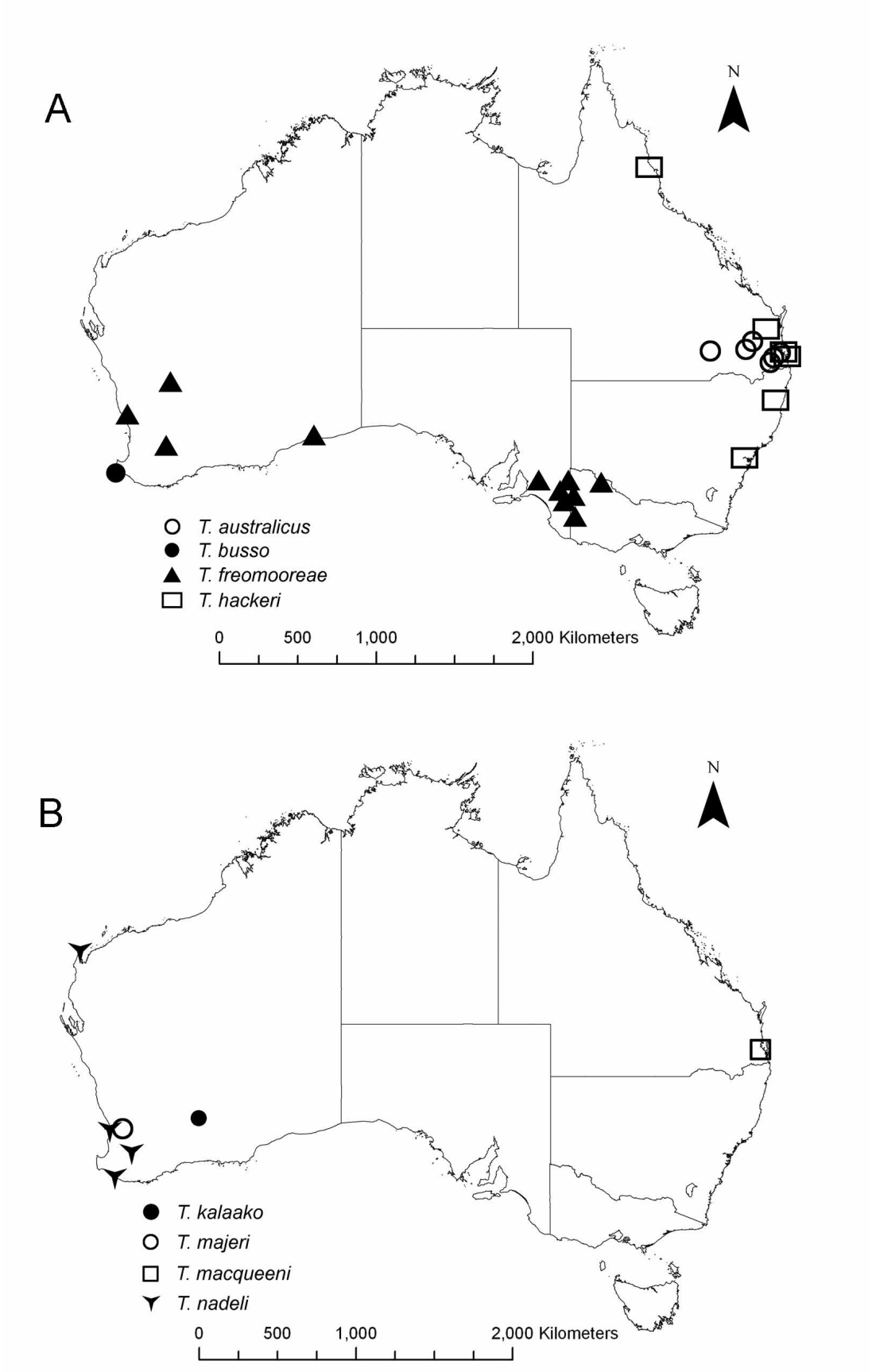

FIGURE 20. Distribution map. **A.** *Thaumastocoris australicus, T. busso, T. freomooreae* and *T. hackeri* **B.** *Thaumastocoris kalaako, T. majeri, T. macqueeni* and *T. nadeli.*

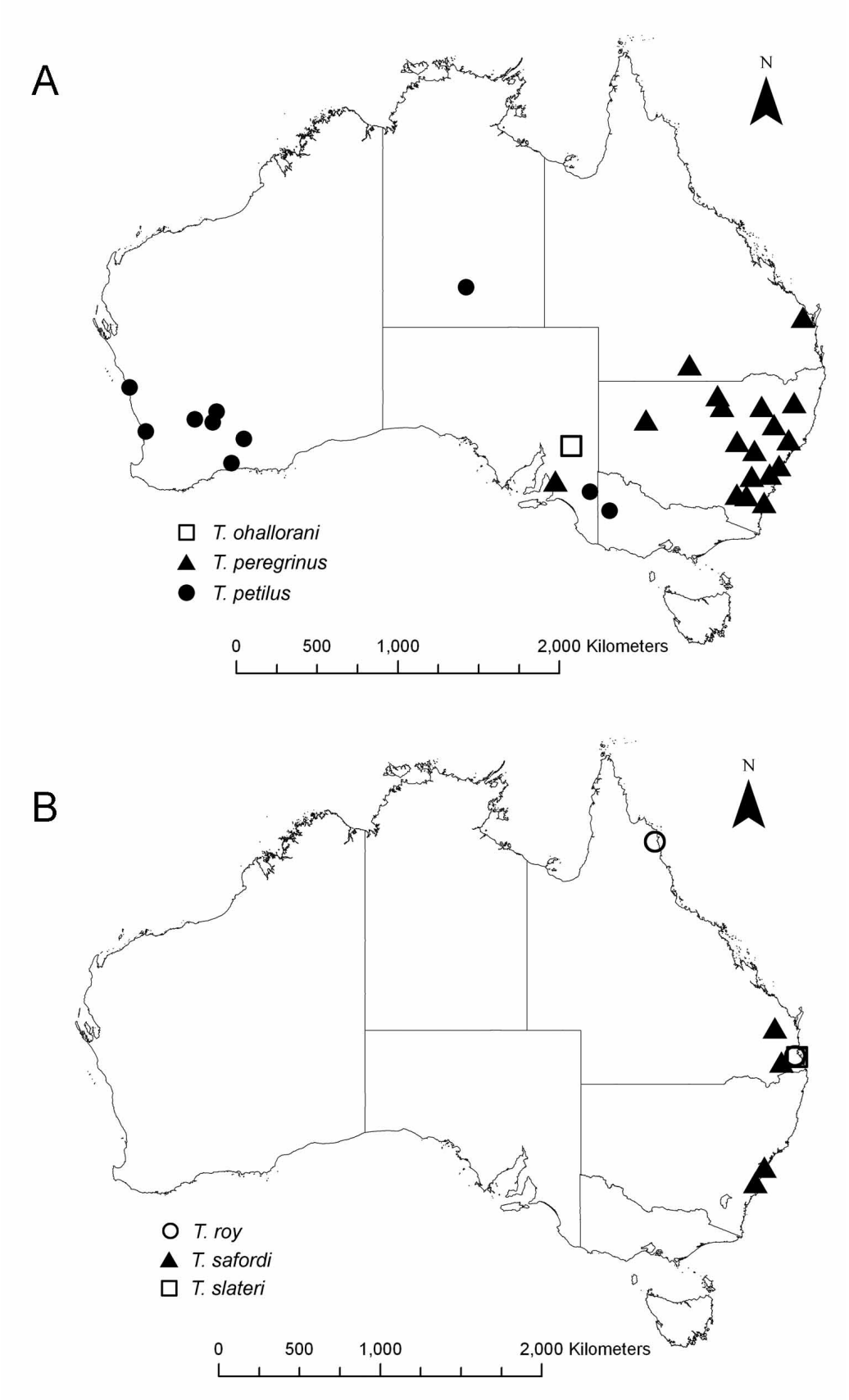

FIGURE 21. Distribution map. **A.** *Thaumastocoris ohallorani*, *T. peregrinus* and *T. petilus* **B.** *Thaumastocoris roy*, *T. safordi* and *T. slateri*.

Discussion

The Thaumastocoridae are a small family of Cimicomorpha containing three subfamilies; the monotypic Thaicorinae from Thailand (Heiss and Popov 2002); Xylastodorinae from South America and New Caledonia (van Doesburg *et al.* 2010), one of which is an introduced pest in Florida; and the Thaumastocorinae which is endemic to the Eastern Hemisphere, with most species endemic to Australia, save the monotypic genus *Wechina* which is restricted to southern India. The three Australian genera are: *Baclozygum*, *Onymocoris*, each containing four species, and *Thaumastocoris*, which prior to this work, accommodated five species.

As a result of this revision, nine new species of *Thaumastocoris* are described, increasing the number of species to 14. In all likelihood there are more species to be discovered, as the majority of species are known from a small number of specimens from a limited number of localities. For example, northern and central Australia are relatively unsampled and, to date, no *Thaumastocoris* have been collected in Tasmania. Furthermore, in this work 29 species of *Eucalyptus* and four species of *Acacia* are confirmed as *Thaumastocoris* hosts. As these two large genera are the dominant components of the Australian flora and occupy much of the continent, sampling for *Thaumastocoris* is in its infancy.

Thaumastocoris has the broadest host range within the Thaumastocorinae. Eight plant families are recorded as hosts with the majority of species associated with Myrtaceae. Three species, *T. freomooreae*, *T. nadeli*, *and T. peregrinus*, are associated with a number *Eucalyptus* species, which have broad distribution ranges. *Thaumastocoris petilus* is also widespread, being distributed along much of the dry southern coastal region and hosted by at least four *Melaleuca* species. Conversely, *T. hackeri* and *T. roy* are narrow range endemics, restricted to the subtropics.

Hill and Schaefer (2000) warned *Thaumastocoris* could become pests on plants planted outside their natural ranges. This is certainly the case with *T. peregrinus* which has infested many of Sydney's street eucalypts, as well as eucalypt plantations in southern Africa and South America. In addition, *T. safordi* is emerging as a destructive pest of *Corymbia* plantations eastern Australia. It is probably pertinent to highlight the possible potential of two additional *Thaumastocoris* becoming pest species because of shared hosts and distribution. *Thaumastocoris nadeli* has a broad host range (three genera) and has been collected from disparate localities: including suburban Perth where it was collected on *E. camaldulensis*, south of Perth it has been taken on *E. nicholii* and *E. scoparia*; these three eucalypts are also hosts of the pestiferous *T. peregrinus*. *Thaumastocoris freomooreae* also has a broad host range, second only in number of host to *T. peregrinus*.

The majority of *Thaumastocoris* species are difficult to separate because differences in their morphology are subtle. Females of *Thaumastocoris* are in the main identified by association with males, where the various modifications of the pygophoral lock and paramere are definitive in delineating species. We observed that for widespread species, such as *T. peregrinus* and *T. petilus*, dissections from widely disparate localities did not reveal any discernible variation in pygophoral lock and paramere within species. Other valuable characters, in combination, are labium length, the thickness of the posterior margin of the bucculae, and forecoxal separation.

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