Fauna Technical Note No. 11: Method for surveying for *Hoplogonus* stag beetle species

FPA
FOREST PRACTICES AUTHORITY

The Fauna Technical Note Series provides information for Forest Practices Officers on fauna management in production forests. These technical notes are advisory guidelines and should be read in conjunction with the requirements of the Forest Practices Code*.*

The technical notes can be accessed on the Forest Practices Authority's website: www.fpa.tas.gov.au.

1. Introduction

Tasmania has five species of stag beetle listed as threatened on the Tasmanian *Threatened Species Protection Act 1995*. These are:

- broad-toothed stag beetle (*Lissotes latidens*) Endangered
- Mt Mangana stag beetle (*L. menalcas*) Vulnerable
- Simsons stag beetle (*Hoplogonus simsoni*) Vulnerable
- Bornemisszas stag beetle (*H. bornemisszai*) Endangered
- Vanderschoors stag beetle (*H. vanderschoori*) Vulnerable

Surveys may be required for these species in areas proposed for forestry operations. Surveys for the three northeast species of *Hoplogonus* can be carried out by hand searching by appropriately trained people. This technical note outlines the recommended survey method for *Hoplogonus* species so that results can be interpreted in terms of existing knowledge. **Protocols for surveying for *Lissotes* species are outlined two separate technical notes (fauna technical notes 4 and 5 in this series) which are available on the FPA's website.**

For further information on Tasmania's threatened stag beetles, see the reading list at the end of this technical note.

2. Who should do surveys?

Surveys should be conducted by trained Fauna officers and/or specialists from DPIPWE/FPA. Collection of any of these species requires a permit from the Threatened Species Unit, DPIPWE. Application forms are available at http://www.dpipwe.tas.gov.au/.

3. Survey methods

Two survey methods are described. One is a search to establish whether a species is present at a site and is recommended for all three *Hoplogonus* species. The other is a more systematic area search method that can be used to obtain density estimates for *H. simsoni* and *H. bornemisszai*.

Method 1. Timed search (to determine species presence at a site)

At least three separate geographic sites should be sampled within the proposed harvest area. The sites should be in areas of suitable habitat, i.e. rainforest and wet eucalypt forest containing coarse woody debris (rotting logs), amongst leaf litter accumulation against logs and under logs. Search under as many logs as possible for live *Hoplogonus* species and body parts of dead beetles. Spend at least two person hours searching at each site.

Adults emerge in late spring/early summer and can be found until March/April. It is thought that most adults die off in autumn so most searches will only find dead specimens. Any live beetles are to be recorded and released at the site of capture. Remains of dead beetles are also to be recorded. Any segments found should be collected, stored in 70% alcohol or methylated spirits and forwarded to FPA Biodiversity Program staff for identification. If you are unsure of the identity of any live specimens, please contact the FPA.

Method 2. Systematic area search

Multiple sites should be sampled within each proposed harvest area in order to capture the range of environments (i.e. different topographies (e.g. gully/flat, mid-slope, and ridge-top), different aspects and slopes, proximity to streams, etc.) present within the harvest area. Where these attributes are relatively consistent, sites should be selected to sample as wide an area as possible. Hence, sites should generally be located greater than 100 m from one another. This will indicate whether the beetle is evenly or patchily distributed through the harvest area. The minimum number of sites that should be sampled is dependent on the size of the harvest area (see Table 1 below).

Table 1 The minimum number of sites to be sampled for various sizes of harvest areas

Harvest area (ha)	Minimum no. of sites
< 50	2
50-100	3
> 100	4

Within a particular harvest area environment (e.g. a mid-slope with an easterly aspect), the site selected should be representative of that environment across the harvest area.

Wherever possible:

- sites should be located at least 30 m from roads, paddocks or other disturbed habitat
- the location of each site (Australian Map Grid co-ordinates) should be recorded from 1:25 000 map sheets and/or with a Geographic Positioning System
- information about the forest habitat at each site should be collected and recorded on data sheets available from the FPA.

At each site:

- a 10 m radius circular plot is marked out (or estimated)
- six $1m^2$ leaf-litter-plots are placed randomly within each plot ensuring all potential microhabitats (i.e. leaf litter, under logs, under rocks, etc.) are sampled
- the leaf litter and other microhabitats are then systematically searched for live *Hoplogonus* species and body parts of dead ones
- bare ground should be avoided but its presence noted on the data sheet.

Each sub-plot should take no longer than 15 minutes to thoroughly search. Therefore, each site within a harvest area should take one person no longer than two hours to complete. Of utmost importance is consistency in search effort between sub-plots and sites.

Any live beetles are to be recorded and released at the site of capture. Parts of dead beetles are also to be recorded. Identifiable body parts included male heads, female heads with thorax attached, and thoraces and abdomens of both sexes. The abdomens of both *Hoplogonus* sexes have distinctive spurs on the front corners of the wing covers. Also, there are very small matching spurs on the thorax of the beetle (see Figure 1).

Record the:

- number of identifiable male/female parts (heads)
- number of live males/females
- total number of identifiable body parts.

The minimum number refers to the least number of beetles that can be inferred as being present from body parts. For example, one male head, two thoraces, one abdomen, and one live female would equate to a minimum number of three; (one dead male, one dead of unknown sex and one live female). This is determined from the two thoraces plus one live female, as the other body parts may have belonged to the same dead beetle. Any doubt about the identification of species should be clarified by FPA Biodiversity Program staff or available specialist.

Completed data sheets should be sent to FPA Biodiversity Program Staff with a map showing the location of the sampling sites.

Contact the FPA Biodiversity Program staff if assistance or further clarification is required.

4. Equipment required

Ideally, surveys should be conducted using a standard 1 m quadrat and sampling vials. These can be supplied by the FPA for about $20. If these are unavailable, a 1-metre ruler (or equivalent measure) and jars with lids can be used.

Further reading

Bartolozzi, L 1996, 'Description of a new species of *Hoplogonus* Parry, 1875 from Tasmania (Coleoptera: Lucanidae)', *Redia* 79:91-95.

Bryant, SL and Jackson, J 1999, *Tasmania's threatened fauna handbook: what, where and how to protect Tasmania's threatened animals,* Threatened Species Unit, Parks and Wildlife Service, Hobart, Tasmania.

Forest Practices Board 2000, *Threatened Fauna Manual for Production Forests in Tasmania*, Forest Practices Board, Hobart, Tasmania.

Meggs, JM 1996, 'Distribution and conservation status of two threatened species of lucanid beetle in Tasmania*',* unpublished report to Forestry Tasmania and the Australian Heritage Commission, Hobart, Tasmania.

Meggs, JM 1997, 'Simsons stag beetle, *Hoplogonus simsoni,* in North-east Tasmania: distribution, habitat characteristics and conservation requirements*',* unpublished report to the Forest Practices Board and Forestry Tasmania, Hobart, Tasmania.

Meggs, JM 1999, 'Distribution, habitat characteristics and conservation requirements of the broad-toothed stag beetle, *Lissotes latidens* (Coleoptera: Lucanidae)', unpublished report to the Forest Practices Board and Forestry Tasmania, Hobart, Tasmania.

Richards, K 1999, 'Occurrence of *Hoplogonus bornemisszai* (Bornemisszas stag beetle) and *H. vanderschoori* (Vanderschoors stag beetle) in priority coupes, north-east Tasmania', unpublished report to Forestry Tasmania and the Forest Practices Board, Hobart, Tasmania.

Publication details

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STAG BEETLE DATA SHEET – TIMED SEARCH

Site Information

Record ID		Date	

Recorders

1		2		3		4	

Grid ref.		Map	Method	Accuracy
E	N			

Locality	Distance	Direction

Forest community	Geology	Search time	No. of logs
Logging history		**Fire history**	

Observations

Species		No.	LS	Cond
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Hoplogonus species survey data sheet

Coupe		Sub-site		Grid-ref		Mapsheet		Collectors	
Date		Coupe area (ha)		Pred. Opt. habitat (ha)		Pred. Sub-opt. habitat (ha)		Describer	

Vegetation description			Species	Altitude		Dist. from road etc.	
OST	HGT			Aspect			
	COV			Slope (°)		Distance from stream	
UST	HGT			Topography		1 = < 30 m 2 = 30-50 m 3 = 50-100 m 4 = > 100 m	
	COV			Flat Gully U/M/L slope Ridge			
TS	HGT						
	COV						
LS	HGT					Fire < 50 yrs (Y/N)	
	COV			Geology (from 1:50 000 maps)			
F	COV			Geocode (from 1:50 000 maps)			
G	COV			Simsons stag beetles			
TOTAL COVER			Open understorey (Y/N)?				

Distinct manfern layer (Y/N)?		HGT		COV	

Leaf litter depth		Leaf litter cover		Selective logging	
1 = < 1cm 2 = 1-2cm 3 = > 2cm		1 = 0-25% 2 = 25-50% 3 = 50-75% 4 = > 75%		1 = zero 2 = low 3 = medium 4 = high	

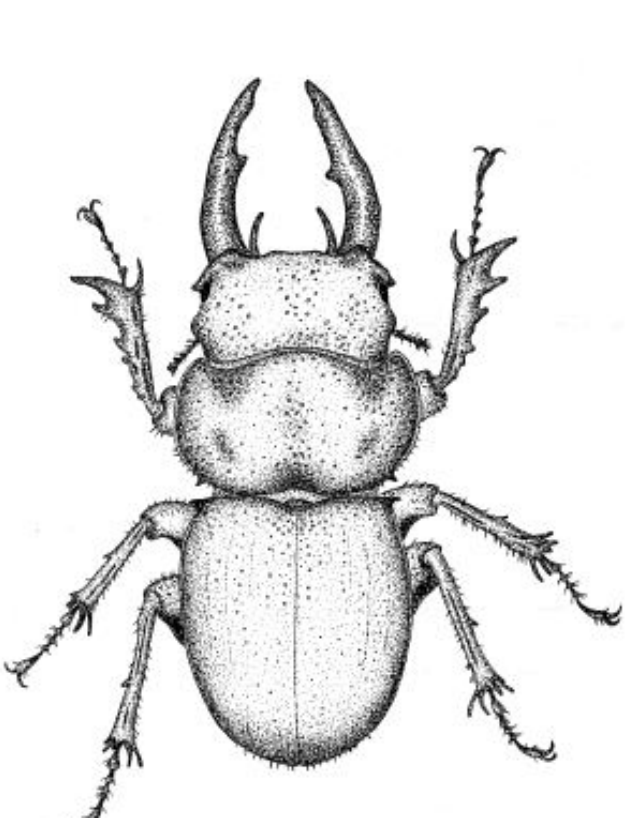
Plot no.	M	F	Live M	Live F	**Min. No.**	Total No.
1						
2						
3						
4						
5						
6						

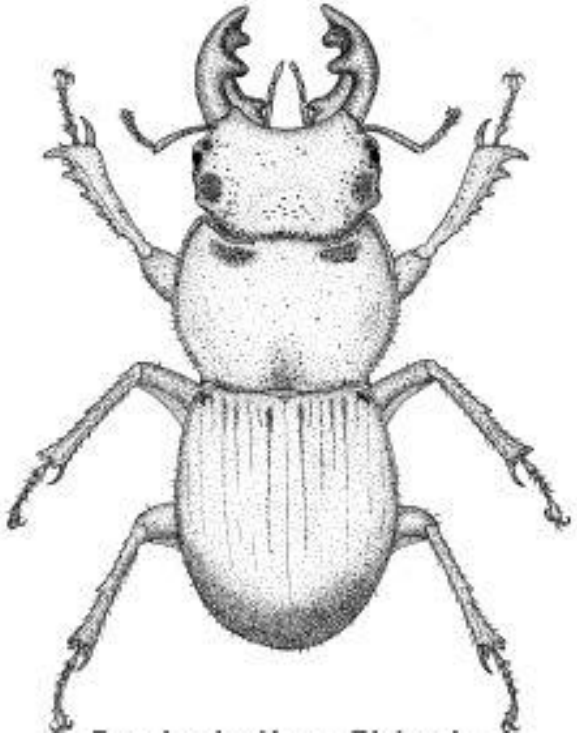
Notes

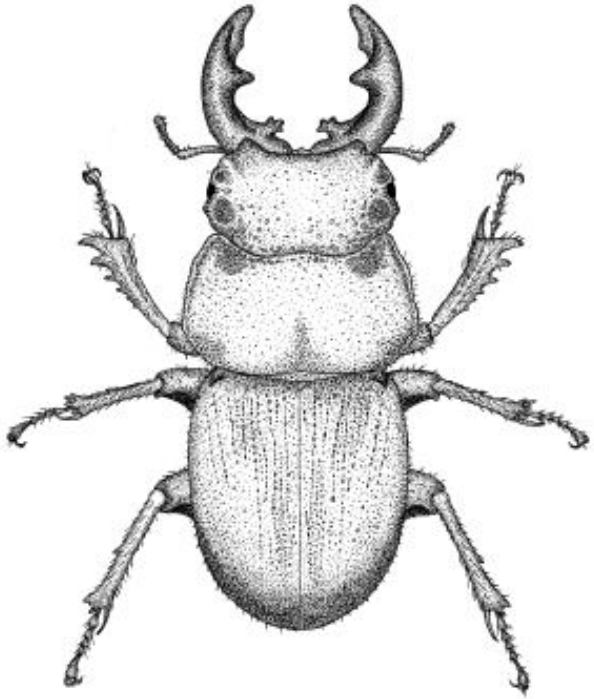
***Hoplogonus* species comparisons**

See profiles in *Threatened Fauna Manual* or refer to reading list in this note for more detailed descriptions.

Drawings by Karen Richards







Simsons stag beetle Bornemisszas stag beetle Vanderschoors stag beetle

Note: only males shown in this diagram