

# First record of the genus *Amphistomus* from the Moluccas (Coleoptera: Scarabaeidae: Scarabaeinae)

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The scarabaeine *Amphistomus alfurorum* sp.n. from Bacan (Moluccas) is described and illustrated, this being the first record of the genus outside mainland Australia and New Guinea. The genus is briefly diagnosed, the described species are listed, and a key to the New Guinea and Moluccan species is provided. Observations on the diel activity of *A. alfurorum* are given.

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## Introduction

Groups of organisms which are essentially endemic to mainland Australia and New Guinea frequently have outposts in the surrounding archipelagoes, including those islands to the West usually joined under the biogeographic name Wallacea. In this respect the scarabaeid beetles are no exception. Many predominantly Australasian scarabaeoid genera have already been recorded from Wallacea, and field campaigns in the region keep turning up novelties. In this paper we describe a new Moluccan species of *Amphistomus* Lansberge, 1874, a genus of the austral scarabaeine group Canthonini, hitherto known from 24 species in Australasia (Matthews 1974, Paulian 1985). The genus is well defined, and the species have a most characteristic habitus, due to a jagged outline and a dorsal pattern of more or less elevated bristle-bearing patches. Two important diagnostic features of *Amphistomus* are the deeply excavate prothoracic (postocular) cavities (to receive infolded forelegs) and the gradual (non-marginate) posterolateral dorso-ventral transition of the prothorax. Our new species was collected in numbers on the island of Bacan, near Halmahera, in 1985, in the context of Project Wallace. The species is characterized by the lack of distinct callosities, tubercles and ridges on its body, and the relatively simple shape of the legs. No *Amphistomus* have been described after the publication of both synopses cited above. It may also be noted here that no further specimens of *Amphistomus* were seen in western Wallacea, for instance on Sulawesi and

Lombok, in spite of our intensive explorations on these islands.

In this paper (part of a series on Indo-Australian island scarabs) we describe and diagnose the new *Amphistomus* species in detail, adding a brief generic diagnosis, a list of the known species, a key to distinguish the Moluccan species from its New Guinea relatives, and a map of the generic distribution. Field observations on the diel activity of the new *Amphistomus* are included.

## Genus *Amphistomus* Lansberge

*Merodontus* Macleay, 1871 (homonym, non Jekel, 1854)

Type-species: *Merodontus calcaratus* Macleay, 1871, by monotypy.

*Amphistomus* Lansberge, early 1874 (replacement name); Matthews, 1974, Paulian, 1985

*Platyphymatia* Waterhouse, late 1874 (replacement name)

Matthews (1974) more than sufficiently clarified and confirmed both the nomenclature (as summarized above) and group position (canthonines, his Canthonina) of *Amphistomus*. The characters used by Matthews and Paulian (l.c.) to identify the species were drawn from (i) the shape of head, pronotum, and leg elements, (ii) the pattern of more or less elevated (tuberculate or ridged) bristle-bearing patches on head, pronotum, elytra and pygidium, and (iii) the shape of the male genitalia. The species from Bacan seems to be relatively basic in the development of character groups i and ii, but the genitalia

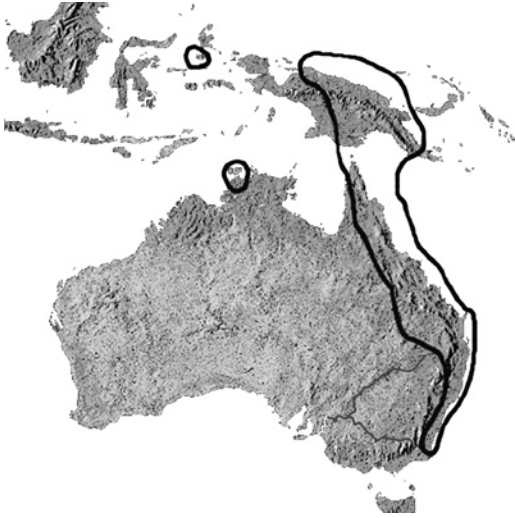


Fig. 1. Approximate known range of *Amphistomus*, in Australasia (Bacan in top left).

show unique, possibly derived features. Although Matthews (l.c.) points out the primary attributes of *Amphistomus* very well, his generic description does not fit all the species included. Characters in the following diagnosis are presented in approximate order of importance.

#### Generic diagnosis

Posterior part of prothoracic side lacking margin, i.e. with gradual dorso-ventral transition. Anterolateral section of pronotum declivous from disc to produced (depressed) anterolateral lobe. Postocular area of prothoracic underside well delimited, concave. Clypeus emarginate, more or less bidentate anteromedially (denticles short, more or less rounded off). Elytra with 7+3 shallow striae, 3 of these striae on broad, abruptly reflexed (dorsally indistinct) pseudepipleuron; epipleuron narrow, complete to elytral apex; pseudepipleural ridge running over interstria 8. Elytral interstriae generally flat or slightly convex (apart from callosities or tubercles). Tarsal claws curved, (very) fine, not dentate on underside. Posterior side of ocular foramen open, posterior genal tip not reaching occiput. Pygidium generally slightly convex or flat, without particular grooves or impressions, base marginate. Femora with conspicuous posterior-inferior longitudinal ridge over almost entire length. Head surface at most with protrusions associated with setae, no other protrusions. Mesocoxae parallel, widely separated, intercoxal lobe not modified. Metatarsal segment 1 longer than segment 2. Protibial

apex not strongly produced. Meso- and metatibiae long, slender, more or less curved; mesotibia with at least 2 distinct external anteapical (fossorial) protrusions. Mentum broad, angularly excised. Parameres more or less asymmetrical. Habitus oblong, dominated by characteristic symmetrical pattern of tufts of setae or bristles, frequently sitting on callosities or on (isolated or fused) tubercles; more or less jagged outline, due to these tubercles or other protrusions. Abdomen with 6 visible, well-delineated sternites. Colour usually uniform (reddish-)brown to black, more or less metallic (bronzed). Size small to medium (body length 4–10 mm).

#### Biology

*Amphistomus* species seem to be associated with mammalian excrement in forest environments, but little is known of their biology. As shown by the distribution map (Fig. 1) they avoid arid and temperate situations. Several continental Australian species are flightless – they have variably reduced hind wings. Matthews (1974) mentioned dung-ball transporting, but was not sure whether *Amphistomus* are true ball-rollers and/or tunnellers. The dirt adhering almost invariably to the setose surface of the beetles, combined with thanatosis, would have a camouflage function – as in certain Drepanocerina from Africa (Krikken 1983). Immature stages of *Amphistomus* unknown.

#### List of described *Amphistomus* species

Abbreviations:

- QLD Australia: Queensland
- NSW Australia: New South Wales
- NT Australia: Northern Territory
- PNG Papua New Guinea
- WNG Indonesia: West Papua (Western New Guinea)

Species marked with an asterisk are the New Guinea-Moluccan species included in the key below. The list follows the arrangement of Matthews (1974), with the extra-Australian species added, arriving at a total of 25 species.

*Amphistomus* Lansberge, 1874

#### Australia:

- squalidus* (Macleay, 1887) – QLD
- inermis* Matthews, 1974 – QLD
- pygmaeus* Matthews, 1974 – QLD
- complanatus* Matthews, 1974 – QLD
- speculifer* Matthews, 1974 – NSW, QLD
- tuberosus* Matthews, 1974 – NT

\* *tuberculatus* (Lansberge, 1885) – QLD (Note 1 below)

*calcaratus* (Macleay, 1871) – QLD  
*accidatus* Matthews, 1974 – QLD  
*palpebratus* Matthews, 1974 – QLD  
*primonactus* Matthews, 1974 – NSW  
*pectoralis* Matthews, 1974 – QLD  
*opacus* Matthews, 1974 – QLD  
*macphersonensis* Matthews, 1974 – NSW, QLD  
*montanus* Matthews, 1974 – QLD  
*storeyi* Matthews, 1974 – QLD  
*trispiculatus* Matthews, 1974 – NSW, QLD  
*cunninghamensis* Matthews, 1974 – QLD

#### New Guinea:

\* *respicens* (Kolbe, 1905) – PNG  
 \* *fasciculatus* (Gillet, 1927) – WNG  
 \* *speculatus* (Gillet, 1927, as variety of *fasciculatus*)  
 – WNG, PNG (Note 2 below)  
 \* *uncinatus* Paulian, 1985 – PNG  
 \* *monticola* Paulian, 1985 – PNG  
 \* *kukali* Paulian, 1985 – PNG

#### Moluccas:

\* *alfurorum* Huijbregts & Krikken, *sp.n.* – Moluccas: Bacan

Note 1. According to Paulian (1985) *A. tuberculatus* as reported from Queensland may represent a species different from *A. tuberculatus*, as originally described from the Torres Strait by Van Lansberge (1885; compare pictures in Matthews 1974 with Paulian l.c.). Mt Ernest Island (or Naghir, spellings vary), the type-locality of *tuberculatus*, is a tiny island, and one wonders how it could harbour a viable population of this generally forest-associated genus.

Note 2. The type of *Platyphymatia fasciculata* var. *speculata* from the Mamberamo River region in northern West Papua (Gillet 1927) has not been recovered, and therefore the action of Paulian (1985) to attach material from a distant region like eastern Papua New Guinea to his *A. speculatus* remains debatable.

#### Key to New Guinean and Moluccan species

Paulian's key (1985) is here adapted to include the Moluccan new species; see also his Figs 23–35. The short diagnosis further below distinguishes the new species *A. alfurorum* from all other *Amphistomus*. The detailed shape of the male genitalia is an all-important character; several pictures are given by Paulian (l.c.), and the male genitalia of *alfurorum* differ from them considerably. For the current interpretation *A. tuberculatus* and *speculatus* see notes above.

1. Pronotal callosities forming distinct longitudinal ridges – Torres Strait region. *tuberculatus*  
 – Pronotal callosities isolated or reduced to simple (superficial) bristle-bearing patches ... 2
2. Apico-internal angle of metatibia (males) elongate, acuminate or more or less truncate ... 3  
 – Apico-internal angle of metatibia (males) distinctly produced into a knob, interior side more or less crenulate ... 7
3. Metatibia feebly curved, as in Fig. 8. Dorsum tuberculate-setose or with tufts of setae only ... 4  
 – Metatibia more strongly curved. Dorsum tuberculate-setose ... 5
4. Dorsum with rows of distinct bristle-bearing tubercles. Metafemur (males) posteriorly with distinct denticle. – Central Papua New Guinea ... *monticola*  
 – Dorsum at most with tufts of setae, lacking tubercles. Metafemur (males) posteriorly at most with slight angle. – Northeastern Moluccas ... *alfurorum*
5. Pronotum with two smooth, shiny callosities. Northern West Papua, Eastern Papua New Guinea ... *speculatus*  
 – Pronotum without smooth, shiny callosities ... 6
6. Metatibia strongly, abruptly curved halfway (knee-like). – Eastern Papua New Guinea ... *respicens*  
 – Metatibia evenly strongly curved. – Northern West Papua ... *fasciculatus*
7. Most of internal side of metatibia crenulate. Apico-internal metatibial protrusion (males) with acute apex. – Eastern Papua New Guinea ... *uncinatus*  
 – Only distal portion of internal side of metatibia crenulate. Apico-internal metatibial protrusion (males) with obtuse apex. – Eastern Papua New Guinea ... *kukali*

#### *Amphistomus alfurorum* sp.n.

Figs 2–11

**Type material.** Holotype male labelled as follows (back slashes separating text lines):

“RMNH / HH 372\ MOLUCCAS: BACAN\ Sibela Range\ alt. m 850 \ 28–04.vi–vii.1985\ J Huijbregts” [printed], “multistr\ evergr forest\ 4 human excr traps” [printed], “hh372r\ 06.15–08.15\ flight activity\ study” [printed] and our holotype label. **Paratypes:** Total 197 ♂ ♀, 10 records, in RMNH Leiden, and Museum Zoologicum Bogoriense, others to be redistributed in due course. All

specimens from Bacan: primary forest on Mt. Sibela (0°43' S 127°35' E), June-July 1985, collected by J. Huijbregts, with further label data as follows.

28-4vi-vii/1985, hh372, 850 m, human excr trap, 58♂, 38♀; 28-4vi-vii/1985, hh373, 850 m, window trap, 1♀; 29-3vi-vii/1985, hh377a, 1000 m, human excr trap, 8♂, 2♀; 1-3vii/1985, hh378, 850 m, human excr trap, 1♀; 30-4vi-vii/1985, hh379a, 650 m, human excr trap, 8♂, 7♀; 4-8vii/1985, hh380, 450 m, human excr trap, 14♂, 8♀; 8-11vii/1985, hh384, 450 m, human excr trap, 20♂, 13♀; 8vii/1985, hh385, 250 m, monkey dung, 1♂, 2♀; 11-15vii/1985, hh388, 250 m, human excr trap, 5♂, 5♀.

### Description (holotype, male)

Body length ca 6.2 mm. Colour generally uniform bronzy-brown, shiny (less so on strongly punctate surfaces). Pilosity abundant, pale yellow-brown, generally short, with numerous tufts of long (more or less curved) setae. Sculpture of much of dorsal side of forebody, ventral parts, coxae and femora consisting of crowded more or less annulate seta-bearing punctures.

Clypeal border with apex subtruncate-emarginate (depending on angle of view), anteromedian depression distinct, laterally limited by slight, rounded protrusion, border laterally straight to slightly protuberant clypeo-genal transition (suture vague); clypeo-genal border finely marginate; clypeal surface slightly concave, gradually declivous to anterior emargination; clypeofrontal transition slightly convex. Gena rounded, surface flat; eyes (in full-face view) with 5-6 facet rows across transversely widest point of rather long foramen. Head surface entirely evenly covered with crowded annulate punctures. Pair of interocular setae-tufts poorly developed.

Pronotum virtually parallel-sided (dorsal view, no lateral protrusions), with disc strongly, evenly convex, anterior margin unmodified, anterior section of lateral border dorso-ventrally carinate along anterolateral lobe, apex of lobe truncate-rectangular; pronotal base widely, evenly rounded, immarginate. Pronotal surface entirely evenly covered with crowded annulate punctures; punctural densities on disc ca 15/ 0.1 sq.mm, their diameters ca 0.05 mm, punctures separated by less than their diameter. Middle with 6 setae-tufts, on either side with 3 thin setae-tufts.

Elytra broad, largely parallel-sided (with sharp, slightly undulate pseudopleural ridge in interstria 8) basomedian surface of elytra deplanate (posteriorly delimited by slight V-shaped buckle); striae shallow, well defined, punctures distinct, ocellate, mostly separated by 2-5 times their diameter, crenulating

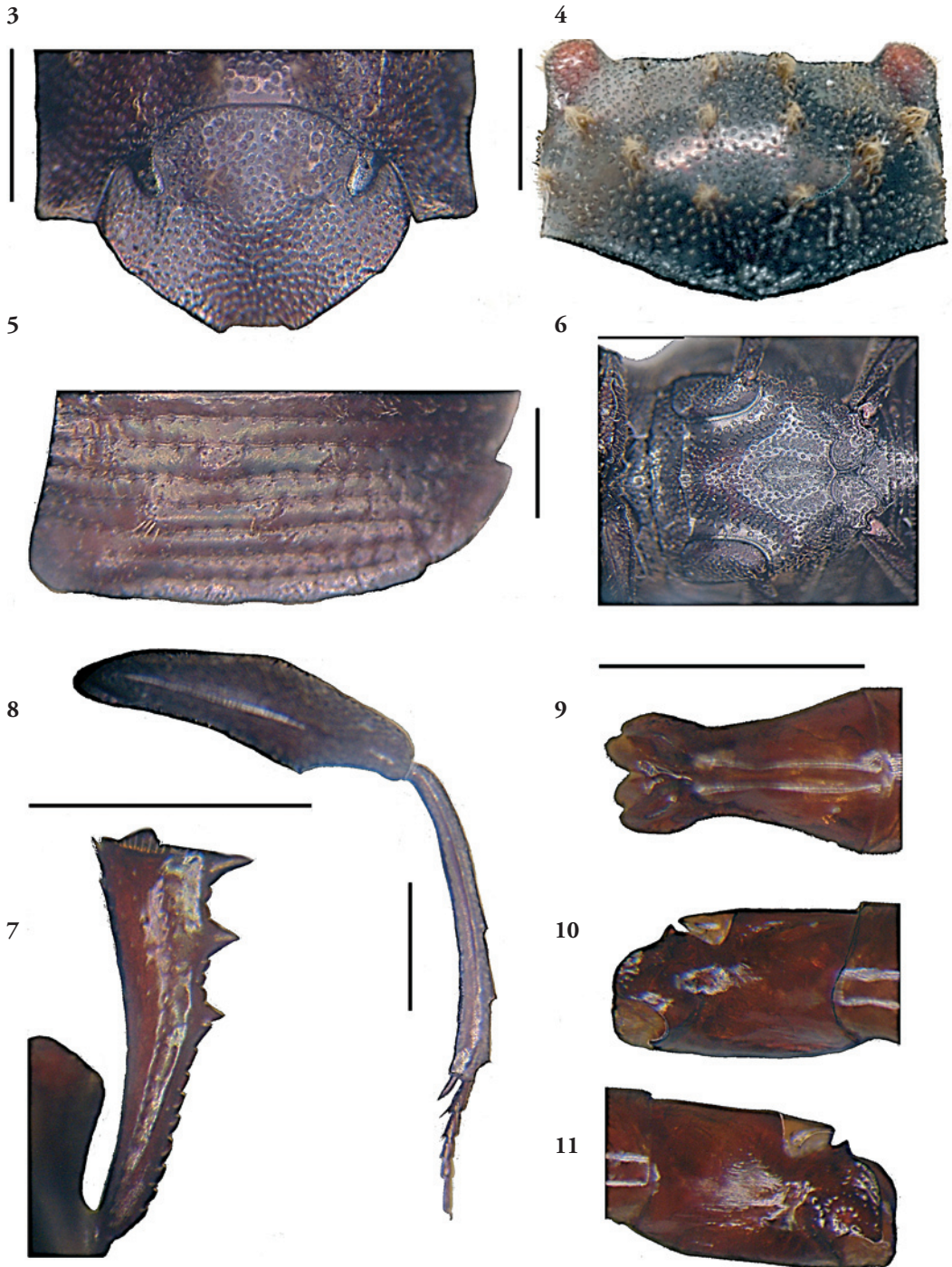


Fig. 2. *Amphistomus alfurorum* sp.n., habitus, dorsal view, holotype. Scale line = 1 mm.

interstriae; interstria 1 and humeral area slightly raised, interstriae 2-7 virtually flat, with sparse seta-bearing micropunctures; many setae-tufts present (see below); pseudopleuron broad, with 3 striae and adjacent interstriae similar to those on disc; pseudopleural ridge evenly curved distad, to angular apex on interstria 3. Alae fully developed.

Antennal club brown. Propectus and mesosternum unmodified. Metasternal disc with elongate-elliptic impression (punctures slightly smaller), anterior lobe medially slightly transversely convex. Abdominal sternites transversely evenly strongly convex. Abdominal venter in profile concave. Pygidium scarcely convex, apical margin widely rounded; base marginate, medially angulate; surface with pair of subbasal setae-tufts and apical concentration of longer setae.

Protibia with 3 fine external denticles separated by few serrations, proximal edge distinctly, entirely serrate; internal side slightly concave-curvilinear; apex virtually straight, transverse, spiniferous, apico-internal angle slightly pointed; terminal spur short, dilated, apex blunted. Protarsus short, compacted,



**Figs 3–11.** *Amphistomus alfurorum* sp.n., selected contours and details. – 3, head and pronotal collar, full-face; 4, pronotum, dorsal; 5, left elytron, dorsal; 6, metasternum, ventral view (prothorax on left side); 7, right protibia, upperside; 8, left hind femur, tibia, tarsus, underside; 9, male genitalia, upperside full-face, 10, right lateral, and 11, left lateral. Scale lines = 1 mm.

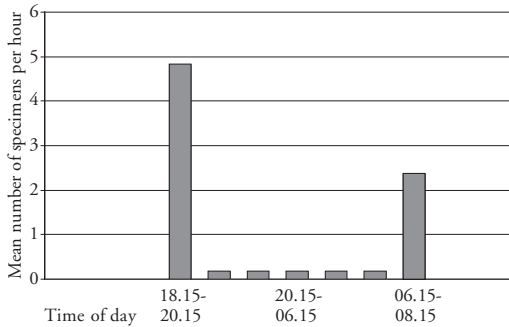


Fig. 12. Diel activity of *A. alfurorum*, showing peaks at dusk and dawn. N=96. Specimens were collected during a flight activity experiment, in which traps were emptied at fixed intervals during a 6-day period. The 24-hour period was divided in two hour intervals (dusk / dawn) and ten-hour intervals (remainder of the night and day). The mean number of specimens per hour is calculated by dividing the total number of specimens collected in an interval during the 6-day period by the total amount of trapping hours of that interval.

claws extremely fine. Profemur unmodified, apart from longitudinal ridge. Trochanters unmodified. Meso- and metatibiae weakly, evenly curved, with slight external (fossorial) protrusions; apex obliquely truncate with crown of fine, short spines, with acuminate terminal spurs. Metatibia with 2 distinct antepical external spiniferous protrusions (the proximal ones obsolescent). Meso- and metafemur elongate, metafemur with distinct angular superior-posterior protrusion at ca 0.3 from apex. Proximal part of metacoxa flattened. Meso- and metatarsus slender; tarsal claws fine, simple; segment 1 of metatarsus slender, much shorter than segments 2–5 combined, approximate proportions of terminal spur and tarsal segments 1–5 are 0.6/1/0.6/0.4/0.4/0.5. Aedeagus, Figs 9–11; with pair of pointed lobes on excavate upperside.

Measurements in mm (dorsal view). Maximum width of head 2.1. Median length of pronotum 1.8, maximum width 2.7. Sutural length of elytra 3.3, maximum width 3.3.

Setae-tufts present (coding according to the system of Matthews, 1974: 187, see his Figs 54–56): HB, TA1, TB1, TB3, TC1, TC2, TC3, EAIII, EAVII, EBIII, EC, PB and additional setae-tufts (see Figs 2, 4), all represented by non-tuberculate tufts only; interstria 1 with 7 more or less evenly spaced tufts.

**Variation and sexual dimorphism.** Development of femoral dentation varies with size. Female. Clypeal teeth more prominent. The protibial spur is longer. Denticles of protibia longer. Metafemur unmodified (no posterior denticle). Abdominal venter in profile straight. Otherwise like male. Total length 4.5–6.2 mm.

#### Diagnostic comment

The complete absence of tubercles, the shape of the pro- and metatibiae and metafemur, the relatively simple shape of the pronotum, and particularly the parameral details (Figs 9–11) distinguish *A. alfurorum* from all other species – note the pointed lobe on the upperside of each paramere.

#### Etymology

Of the Alfurans: an old designation for a people of Halmahera and neighbouring islands.

#### Biology

All specimens were found in primary forest, mostly being attracted to ground traps baited with human faeces. Three specimens were found in dung probably from Crested black macaques (*Macaca nigra* Desmarest, 1822), while only one specimen was collected with a flight interception trap. *A. alfurorum* was found at an altitudinal range of 250–1000m, at all the localities sampled with baited pitfall traps on Mt Sibela. The majority of the type series was collected during a simple diel activity experiment, in which traps were emptied at fixed intervals during a 6-day period. The 24-hour period was divided in two hour intervals (dusk / dawn) and ten-hour intervals (remainder of the night and day). During this experiment *A. alfurorum* showed distinct activity peaks at dusk and dawn (Fig. 12). No specimens were caught during daytime. This is in accordance with the observation by Matthews (1974) that wandering activity and copulation in two Australian species (*A. speculifer* and *A. primonactus*) kept in captivity by him, always occurred at night. According to Rortais (2003) *A. pectoralis* is also active at night.

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