Fog collection by Namib Desert beetles

Sir, — It is the obligation of all authors correctly to identify subjects of observations and experiments. While the matter of what and how important species are remains a matter of serious scientific debate, failure to identify subjects in the literature would lead to chaotic discourse.

We endeavour to facilitate work by those interested in studying the Namib Desert tenebrionids, including identifying tenebrionid beetle species. An example of the failure to identify tenebrionid species correctly is provided by Parker and Lawrence,[1] who report experimenting with the fog-collecting behaviour of a Namib Desert tenebrionid beetle, a *Stenocara* species, and suggest a special controlling mechanism these beetles may use to enhance the efficiency of the process. They conclude that the dorsal surface structure of their subject is ideally suited for capturing fog; so effective indeed that they patented its '*Stenocara* structure'.

Fog-collecting behaviour of the diverse endemic Namib Desert Tenebrionidae is species-specific[2–6] but Parker and Lawrence do not exactly identify any species in their account. The photograph accompanying their paper appears to be *Physosterna cribripes* and is not a *Stenocara* species. *Physosterna* are species completely different in design and much larger than any of the several Namib Desert *Stenocara* species.

These authors report also that a species they videotaped or have seen on videotape fog basks in the manner 'typical of the family', holding the head down and raising the abdomen while facing prevailing advective fog. But fog-basking is not typical of the Tenebrionidae family and has not been observed in *Physosterna* or in any *Stenocara* species by other observers. Several comparative studies specifically directed to the evaluation of the distribution of fog-basking among the more than 200 Namib Desert tenebrionid species,[4–6] including 71 species we have intensively monitored over the past 25 years,[7] have so far found only two species — both *Onymacris* — to be fog baskers.[2,4] These species have substantially different dorsal surface characteristics from species that do not fog bask.[8] The tilting posture Parker and Lawrence report having seen is a common alarm response of many tenebrionids, including *Physosterna*.

The most common fog-collecting behaviour of Namib Desert tenebrionids that so act is either to suck precipitated water from fog-wetted sand, from ridges pushed up by the beetles from trenches perpendicular to the wind that drives the fog (four species of *Lepidochora*),[3] or to suck water directly from water precipitated on vegetation.[4,6] Beetle species that make use of fog water directly in any way are a small minority of the Namib Desert tenebrionid fauna. The most common response of diurnal Namib Desert tenebrionids, including all *Stenocara* and *Physosterna* species, is to remain buried on foggy and all other mornings and to emerge later in the day when the substrate has warmed and is dry.[4]

Parker and Lawrence state the '*Stenocara* structure' allows fog collection to proceed rapidly and that without their newly discovered controlling mechanism fog water would be quickly lost to the heat and winds of the Namib Desert. There is an advantage to be gained by maximizing the rate of fog water uptake by those species that do collect fog water at the low body temperatures attainable at night when fog occurs. At low temperatures these species, which are diurnal in their other activities, are slow and sluggish and thus vulnerable to predation.[6] They also need to maximize the rate of water intake during the sometimes brief and unpredictable fog events. But loss of fog-precipitated water to extreme heat is not a problem because fog basking occurs at 100% relative humidity and at ambient temperatures of 5–18°C during late night or early dawn (M. Seely, pers. obs., see ref. 6), below the range of temperatures used by Parker and Lawrence[1] (22–66°C) in their experiments.

We do not challenge Parker and Lawrence's discovery of a mechanism that facilitates fog collection by the physical properties of the dorsal surface of *Stenocara* or *P. cribripes* and by beaded glass slides, but they have not demonstrated its applicability to fog water collection by any Namib Desert beetle species that actually collects fog water in nature.

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