

TRIBULUS



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TRIBULUS

NOTES FOR CONTRIBUTORS

TRIBULUS is the Journal of the Emirates Natural History Group and was launched in 1991. The Group was founded in 1976, and over the next fourteen years, 42 issues of a duplicated Bulletin were published.

TRIBULUS is published twice a year. The aim of the publication is to create and maintain in standard form a collection of recordings, articles and analysis on topics of regional natural history, heritage, geology, palaeontology and archaeology, with the emphasis on the United Arab Emirates and adjacent areas. Papers, short notes and other contributions are welcomed from anyone but should not have been published elsewhere. Guidelines are set out below. The information carried is as accurate as can be determined, in consultation with the Journal's Advisory Panel and referees, but opinions expressed are those of the authors alone.

All manuscripts received are reviewed by the Editorial Board and appropriate Advisory Panel members and, where appropriate, are also submitted to blind peer review.

Correspondence and enquiries should be sent to:

The Editor,
TRIBULUS,
P.O. Box 45553, Abu Dhabi - U.A.E.
or by e-mail to: hellyer@emirates.net.ae

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The plant motif above is of the genus *Tribulus*, of which there are six species in the UAE. They all have pinnate leaves, yellow flowers with free petals and distinctive five-segmented fruits. They are found throughout the country, except in coastal sabkha.

The animal motif above is of a tiny golden bull, excavated from the early Second Millennium grave at Qattarah, Al Ain. The original is on display in Al Ain Museum, and measures above 5 cm by 4 cm.

Manuscripts should be submitted in electronic form, with a printed copy, typed on one side only, and double-spaced. A short abstract should precede the article, with the address(es) of the author(s) at the end. Photographs may be submitted and should be clearly captioned. Line drawings and maps, if not submitted in electronic form, should be in black ink on strong white or translucent paper. References should give the author's name, with the year of publication in brackets, and with the list of articles, showing title and publisher, in date order. Scientific names should follow customary nomenclature in Latin, while the English and, if appropriate, available local Arabic names should also be supplied.

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Front: *Cistanche tubulosa* on Marawah (see p.20).

.....Picture by Simon Aspinall

Back: Water catchment system at Dabb'iya (see p. 5)

..... Picture by Peter Hellyer

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An ambidextrous fiddler crab

by Peter Hogarth and Mark Beech

Anyone who has spent time in mangrove habitats will have been struck by the abundance of colourful little fiddler crabs (*Uca*), several species of which occur in the UAE (Hogarth and Beech, *in press*). Male fiddlers have one claw very much larger than the other – in some species it may be longer than the animal's entire body and weigh a third or more of the total body mass. The minor claw of males, and both claws of females, are very different in shape and are used for feeding. *Uca* feeds by scooping up sand or mud, using its mouthparts to separate organic particles from sand grains, dumping the latter and passing the digestible organic matter into its gut. As males have only one feeding claw, compared with the two of females, feeding is much harder work for them (Weissburg 1993).

The male's enlarged claw is waved around in a distinctive pattern characteristic of each species, as a signal to attract females and deter rival males. If the threat fails to deter, then the claw becomes a weapon in the ensuing joust. In some species of *Uca* the major claw is consistently on one side, usually the right, but in most species, such as *U. inversa*, the population splits into roughly equal numbers of right-handed and left-handed individuals.

On a recent visit to the mangroves of Kalba, we came across a male *Uca inversa*, one of the common fiddler species of the UAE, which bore two major claws, one slightly smaller than the other, but both clearly shaped for display rather than feeding purposes (see *Figure*). Males with two major claws have been noted in one or two species of *Uca*, but are extremely rare (Takeda and

Yamaguchi 1973, Yamaguchi 1977, and personal communications from several colleagues).

How did this come about? It raises questions about what determines fiddler crab handedness in the first place. There have been several theories, none convincingly established. Fiddler crabs start out symmetrical, with handedness appearing progressively in males while they are still small. In exclusively right-handed species this must be determined genetically, but in other species, such as *U. inversa*, it may be random. Once an individual crab becomes left- or right-handed, it never subsequently changes. It has been shown experimentally in several species of *Uca* that if a major claw is lost, the replacement is always another major claw, never a minor one, so handedness remains the same (Vernberg and Costlow 1966, Ahmed 1978).

Losing claws and legs is an occupational hazard of being a crab. In fact, crab legs have a weak point and a special muscle so that they can autotomise, or spontaneously snap off their own leg. This is important to survival. If, for example, a crab is trapped by a stone rolling onto its leg, or if the leg is seized by a predator, the crab can escape. Occasionally a crab can be found hobbling around on two legs and a claw, the remaining seven limbs having been shed.

Crabs are good at regenerating lost limbs. Regeneration takes time, and progress is only made when the crab moults its carapace. Usually the first sign of regeneration is a tiny bud at the point where the leg was lost. After a moult this may appear as a tiny limb folded up within the regeneration bud. After the next moult, this becomes a



Male *Uca inversa* from Khor Kalba - the animal almost concealed by its two major claws

free limb, complete in all its parts, but much smaller than the one it replaces. It catches up in size over successive moults.

The Kalba specimen has one claw smaller than the other, suggesting that the mistake was made during regeneration of a lost minor claw, and that the regenerating left claw would eventually have increased to full size as a mirror image of the major right hand one. Apart from this, there is no clue about what went wrong. If this is a result of a mistake during regeneration, the size of the smaller major claw indicates that it happened several moults earlier, and that the male has survived successfully for some time. How did it feed during this time, with no minor claw? There have been observations of fiddlers using major claws to shovel mud towards the mouth, and of some that had lost both claws ploughing into the sediment with their mouthparts alone. Feeding may be inefficient, but is still possible, without the requisite limbs.

Finally, it would be interesting to know the impact of having two major claws on this individual's social life. Was it twice as effective at attracting a mate, or were any social advantages outweighed by the cost of carrying two such extravagant structures around and being handicapped in feeding?

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Dr. Peter Hogarth
Department of Biology (Area 1)
University of York
P.O. Box 373
York YO10 5YW, UK
Email: pjh4@york.ac.uk

Dr. Mark Beech
Abu Dhabi Islands Archaeological Survey,
PQ Box 45553, Abu Dhabi, UAE
Email: adias@erwda.gov.ae



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