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.

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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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## Contents

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Editorial</td>
<td>4</td>
</tr>
<tr>
<td>Newly-discovered Coastal and Island Archaeological Sites in North East Abu Dhabi</td>
<td>5</td>
</tr>
<tr>
<td>by Peter Hellyer</td>
<td>5</td>
</tr>
<tr>
<td>A winter survey of insects and other terrestrial invertebrates on Marawah Island, Abu Dhabi</td>
<td>12</td>
</tr>
<tr>
<td>by Michael P.T. Gillett and Conrad P.D.T. Gillett</td>
<td>12</td>
</tr>
<tr>
<td>Occurrence of the Western Pygmy Blue butterfly (<em>Brep tidium exilis</em> [Boisduval]) on offshore islands of Abu Dhabi, including Marawah Island (Lepidoptera: Lycenidae)</td>
<td>20</td>
</tr>
<tr>
<td>by Michael P.T. Gillett</td>
<td>20</td>
</tr>
<tr>
<td>Grazing of the parasitic plant <em>Cistanche tubulosa</em> (Orobanchaceae) by mountain gazelles <em>Gazella gazella</em> on Marawah island</td>
<td>21</td>
</tr>
<tr>
<td>by Michael P.T. Gillett</td>
<td>21</td>
</tr>
<tr>
<td>A report of the slender sunfish <em>Ranzania laevis</em> (Pennant, 1776) from the UAE East Coast</td>
<td>22</td>
</tr>
<tr>
<td>by Philip Iddison</td>
<td>22</td>
</tr>
<tr>
<td>An ambidextrous fiddler crab</td>
<td>24</td>
</tr>
<tr>
<td>by Peter Hogarth and Mark Beech</td>
<td>24</td>
</tr>
<tr>
<td>A new owtfly for the UAE: <em>Bubopsis hamata</em> (Klug) (Neuroptera: Ascalaphidae)</td>
<td>26</td>
</tr>
<tr>
<td>by Brigitte Howarth and Simon Aspinall</td>
<td>26</td>
</tr>
<tr>
<td>A list of rare birds in the UAE requiring descriptions</td>
<td>27</td>
</tr>
<tr>
<td>by Emirates Bird Records Committee</td>
<td>27</td>
</tr>
<tr>
<td>News Roundup</td>
<td>28</td>
</tr>
<tr>
<td>Reviews, Publications and Research</td>
<td>29</td>
</tr>
</tbody>
</table>

**Cover illustrations:**

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*

The Editorial Board of TRIBULUS and the Committee of the Emirates Natural History Group acknowledge, with thanks, the support of the Group's Corporate members, a full list of whom can be found on Page 4, without whom publication in this format would be impossible. We also acknowledge the support and encouragement of our patron, H.E. Sheikh Nahayan bin Mubarak Al Nahayan, UAE Minister of Higher Education and Scientific Research.

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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 molts its carapace. Usually the first sign of regeneration is a tiny bud at the point where the leg was lost. After a molt this may appear as a tiny limb folded up within the regeneration bud. After the next molt, 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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