JOURNAL OF CRUSTACEAN BIOLOGY, 22(2): 497–501, 2002

CONVERGENT DESIGN OF CARIBBEAN AND PHILIPPINE BAMBOO LAND-CRAB TRAPS

David P. Maitland

The Crab Lab, Napier University, 10 Colinton Road, Edinburgh EH10 5DT, United Kingdom
(d.maitland@napier.ac.uk)

A B S T R A C T

Local inhabitants of the Caribbean island of Tobago catch land crabs *Cardisoma guanhumi* (Herbst, 1796) in an ingenious tube trap made from bamboo. The trap bears a remarkable resemblance to bamboo land-crab traps used in the Philippines. The bamboo-tube trap reported here has not previously been reported from the New World. Tobagonian bamboo-tube traps are baited with local fruits and are positioned on the surface adjacent to crab burrow entrances. In contrast, Old World bamboo-tube traps are reportedly used unbaited and are inserted into the mouths of crab burrows. The striking structural similarity between Caribbean and Philippine bamboo traps lends ethnographic interest, while the traps' simple design and ability to catch land crabs alive and unharmed make them a viable research tool in population studies of land crabs. Similar traps could be made from modern plastic drainage piping.

In the New World southern Caribbean islands of Trinidad and Tobago (T&T), residents catch land crabs in an ingenious trap made from a few pieces of bamboo and strips of rubber cut from old car-tyre inner tubes. Traps primarily are used to catch the edible land-crab *Cardisoma guanhumi* (Herbst, 1796) (local names: Iron back, Blue crab, Smooth crab, Callaloo crab). The T&T trap bears a remarkable resemblance to bamboo land-crab traps used in the Old World central Philippine island of Cebu, the Marianas in western Micronesia (Barnwell, 1982), and on the Island of Yap in Micronesia (Müller, 1917) (Fig 1). Bamboo land-crab traps have not previously been described from the New World (Feliciano, 1962; Barnwell, 1982). The similarity of these bamboo crab traps, now found globally in widely separated localities, suggests independent invention. Local peoples using common natural materials (with little or no economic outlay) have converged on a similar design for a successful trap. Further ethnographic discussion of the origins and use of bamboo-tube crab traps in Micronesia is provided by Barnwell (1982). The traps' simple design and ability to catch crabs alive and unharmed make such traps a viable research tool in population studies of land crabs.

Construction of Tobagan Crab Trap

The following description is made from a representative working trap obtained from professional crab-catcher Mr. L. Fraser of Tobago.

The trap is made from 5 pieces of bamboo: the body, the trap-door, the cross-bow, the trigger, and the spindle (Fig. 2).

The cylindrical main body of the trap is constructed from a nodal section of mature bamboo stem about 40 cm in length and 10 cm in diameter (internal diameter ~ 8 cm), the precise dimensions depending on the piece of bamboo selected. One end of the tube is naturally closed off by the presence of a transverse nodal wall about 3 cm from its posterior end. Three modifications are made to the tube to accommodate the trap mechanism (Fig. 2). 1) A transverse rectangular trigger hole (2 cm × 4.5 cm) is cut into the upper surface about 8 cm from the rear of the trap. 2) A larger rectangular trap-door hole (2.5 cm × 7 cm) is cut into the upper surface about 7 cm from the front of the tube. These two holes are 17 cm apart. 3) A tangential cut is made into the bamboo wall along the rear edge of the anterior trap-door aperture in order to form a split (5 cm wide and about 7 cm in length) designed to hold the cross-bow in place at right angles to the tube (Figs. 2, 3).

The trap-door is a rectangular concave section of bamboo stem 16 cm long and 7 cm wide. The lower corners are trimmed to allow a snug fit between the bottom of the trap-door and the concave inner trap surface. The top of the trap-door also has its corners re-

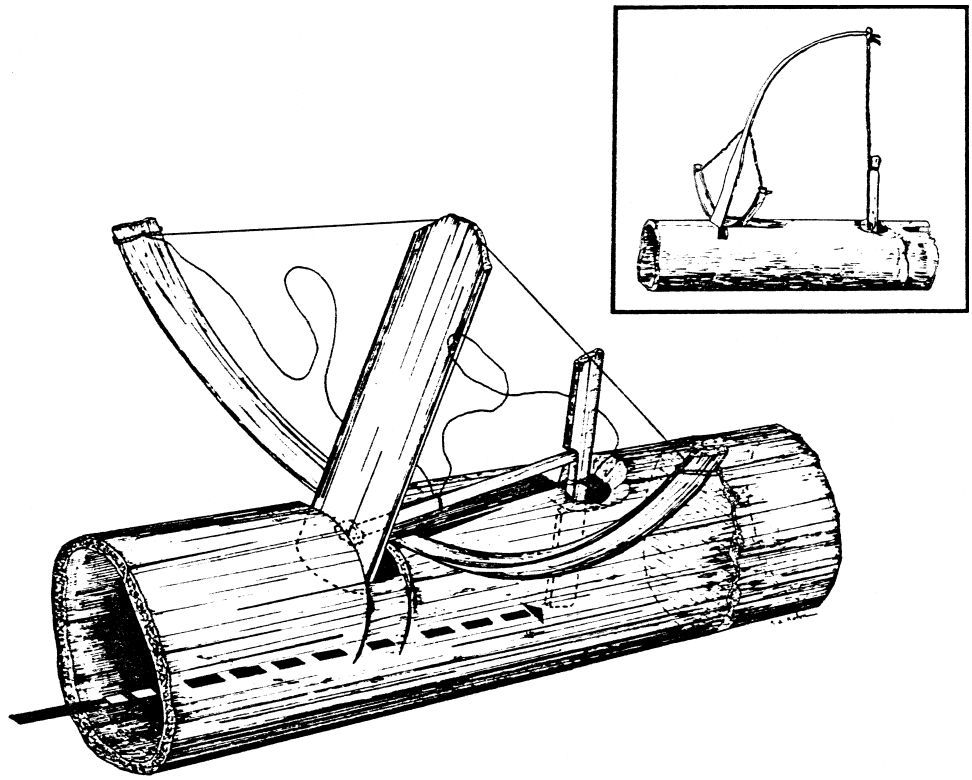

Fig. 1. The Philippine land-crab trap set in the cocked position. The inset shows the trap used on Yap in western Micronesia (from Barnwell, 1982; after Müller, 1917).

moved so that a 0.8-cm square section is formed at its apex, into which is cut a vertical slot. A rubber-tube bowstring is inserted edge-on into this slot (see below). The inner lateral margins of the trap-door are shaved flat to improve the movement of the door against the wall of the tube. A horizontal, small rectangular notch (1.5 cm × 0.6 cm × 0.5 cm) is cut into the midline of the trap-door's lower inner face 1.5 cm above the lower edge to form a ledge designed to catch one end of the spindle (Figs. 2, 3).

The cross-bow, trigger, and spindle are all slivers of bamboo stem made by longitudinally splitting a length of bamboo wall in half so as to produce two matched lengths 0.4 cm thick.

The cross-bow is a bamboo sliver 19 cm long and 0.7 cm wide. The bowstring is formed from a strip of rubber (30 cm long, 1 cm wide) cut from an old car-tyre inner tube and bound to either end of the cross-bow using two narrow strips of rubber (13 cm long, 5 mm wide) (Fig. 2).

The trigger is either cut from bamboo (bait needed) or from the base of the stem of a fresh banana leaf (trigger acts as bait; see below) so that it is 17 cm long and 1 cm wide, with a sharp tapered point and a rectangular section (5 cm × 0.5 cm) cut out of the middle of one edge 2.5 cm from the tip so that two opposing horizontal ledges are formed; the lower ledge engages the internal anterior edge of the trigger hole while the upper ledge simultaneously clips over the end of the spindle when the trigger mechanism is assembled (Figs. 2, 3).

The spindle is a simple squared-off section of bamboo 20 cm long and 0.7 cm wide. One end of the spindle is inserted into the notch on the inner face of the trap-door, while the other end is slipped under the trigger's top ledge (Figs. 2, 3).

Trap Assembly and Operation

The cross-bow is pushed (bowstring facing up) into the tangential split cut into the rear edge of the anterior aperture of the trap body. The trap-door is inserted vertically, point up, within the anterior aperture and with its rear concave surface facing the crossbow. The

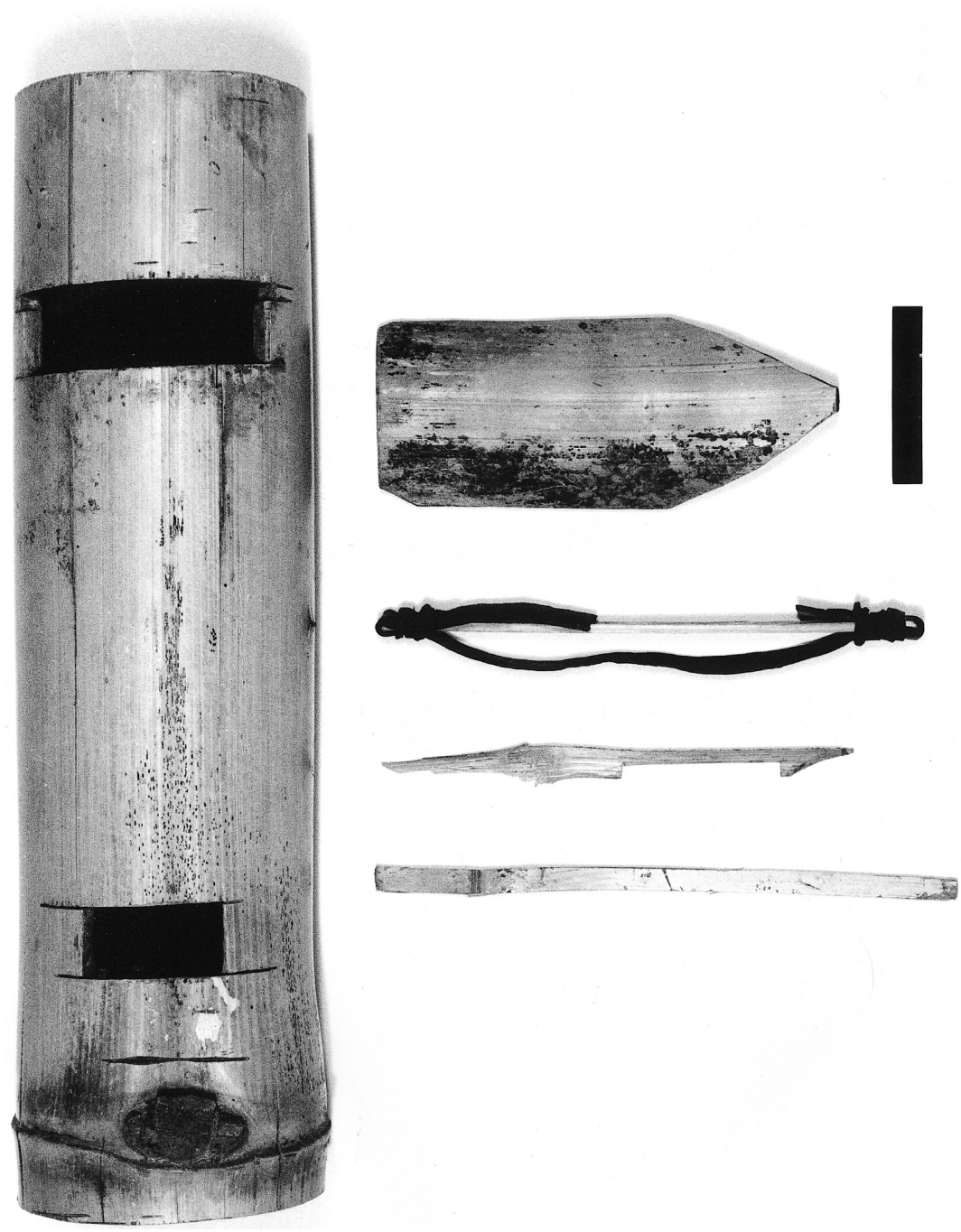

Fig. 2. Bamboo crab trap disassembled showing the five component parts: the body, the trap-door, the cross-bow, the trigger, the spindle (clockwise from the top). Scale bar = 5 cm.

rubber-tube bowstring is inserted edge-on into the slot cut into the tip of the trap-door (Fig. 3). Next, the trigger is positioned within the rear aperture (trigger hole) so that the lower ledge engages the internal anterior edge of the trigger hole while at the same time the spindle is brought in so that the upper ledge of the trigger simultaneously clips over one end of the spindle. At the same time, the other end of the spindle is inserted into the notch cut

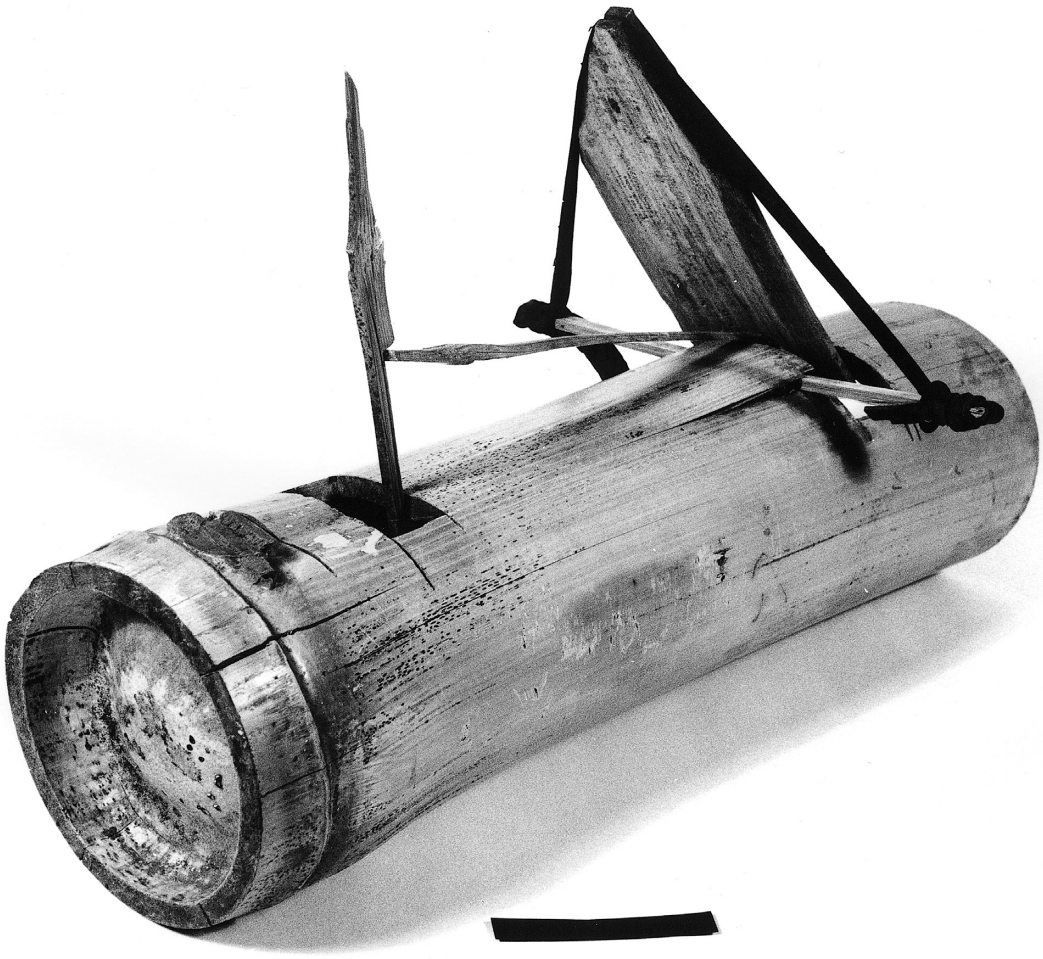

Fig. 3. Bamboo crab trap fully assembled and cocked. Trap-door assembly is to the right, trigger assembly is to the left. Scale bar = 5 cm.

into the concave back of trap-door as it is raised against the pull of the stretched bow. In this position, the spindle prevents the trap-door from slamming shut, and the trap is cocked (Fig. 3).

The trap is baited by skewering a piece of firm fruit (e.g., guava) onto the tip of the trigger if the trigger is made of bamboo. Crab-catchers in Castara, Tobago, craft the trigger stick from the stem of a freshly cut banana leaf. Thus, the trigger also acts as the bait. A crab that enters the trap and pushes or pulls against the trigger tip in an effort to consume the bait is likely to dislodge the trigger from its hold on the edge of the trigger hole. This done, the spindle is released allowing the bow to slam the trap-door shut. The crab is trapped.

These bamboo traps are extremely efficient. Fifty traps set overnight in a bananna grove in Kendall, Tobago, yielded 25 crabs the next morning—crabs that were subsequently trussed up in "strings" of 20 and sold at the side of the road or in the market in Scarborough. High catching efficiency undoubtedly puts pressure on local crab populations. Anecdotal reports indicate that blue crabs (*Cardisoma*) are under pressure. In Trinidad blue crabs are reportedly smaller in size and of lesser "quality" than Tobagan specimens. Tobago blue crabs command a premium at Trinidad markets. Blue crabs in Tobago, however, are now becoming more scarce and generally smaller than they were 10 to 20 years ago (L. Fraser, personal communication).

We have successfully used the bamboo trap

to catch Manicou crabs *Eudaniela garmani* (Rathbun, 1898) (Rodriguez, 1982) (formerly *Pseudothelphusa garmani garmani;* see Rodriguez, 1966), a large freshwater land crab found in the mountain streams of Trinidad and Tobago (Stonley, 1971; Innes and Taylor, 1986) by replacing vegetable bait with fish.

Acknowledgements

This study was supported by Royal Society grant (No. 16466) to DPM. Local fisherman Mr. Lawrence Fraser, Kendall, Tobago, provided the crab trap and showed me his crab-catching methods.

Literature Cited

Barnwell, F. B. 1982. A Philippine land-crab trap.—Journal of Crustacean Biology 2: 202–206.

Feliciano, C. 1962. Notes on the biology and economic importance of the land crab *Cardisoma guanhumi* Latr. of Puerto Rico.—Special Contribution, Instute of Marine Biology, University of Puerto Rico.

Innes, A. J., and E. W. Taylor. 1986. Air breathing crabs of Trinidad: adaptive radiation into the terrestrial environment. I. Aerobic metabolism and habitat.—Comparative Biochemistry and Physiology 85A: 373–381.

Müller, W. 1917. Yap. Pp. 1–811 *in* G. Thilenius, ed. Ergebnisse der Südsee-expedition 1908–1910. II. Ethnographie B. Mikronesian 2. Friederichsen and Co., Hamburg.

Rodriguez, G. 1966. The freshwater crabs of the genus *Pseudothelphusa* from northern Venezuela and Trinidad (Brachyura, Potamonidae).—Zoologische Mededelingen 41: 111–135.

———. 1982. Les crabes d'eau douce d'Amérique. Famille des Pseudothelphusidae.—Faune Tropicale 22: 1–223.

Stonley, J. M. 1971. A monograph of the crabs of Trinidad.—M.Sc. Thesis, University of the West Indies at St. Augustine, Trinidad.

Received: 10 October 2000.
Accepted: 27 June 2001.

ANNOUNCEMENT

Recent Publication

Biology of Freshwater Crayfish, edited by David M. Holdich. October 2001. 720 pages, 170 illustrations. Blackwell Science, Ltd. UK, Osney Mead, Oxford, OX2 OEL; Tel. +44(0) 1865 206206, Fax. +44(0) 1865 721205. Hardback 063205431X. Price £110.00.

From the publisher: "Crayfish are the largest, mobile freshwater invertebrates with some 540 recognised species. They are of long standing interest to anatomists and physiologists. For their great commercial importance as a human food delicacy, crayfish are now becoming of wider interest to molecular biologists, and also to conservationists due to the fact that in some countries many of the native crayfish species are under threat from human activity, disease, and competition from other introduced crayfish species. This fully comprehensive book covers all major aspects of these important animals, including taxonomy, anatomy, evolution, growth and reproduction, behaviour, ecology, physiology, conservation, genetics, immunology, environmental aspects, and diseases. There are separate chapters on each genus of crayfish of commercial importance. Written by 22 well-known experts, *Biology of Freshwater Crayfish* has been carefully edited by David Holdich, internationally recognised for his work with these animals."