Journal of Shellfish Research, Vol. 17, No. 4, 1259–1261, 1998.

A DEVICE FOR ACCURATE AND RAPID SIZE MEASUREMENTS OF MOLLUSCS

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ABSTRACT The construction and use of a measuring device for hard-shelled molluscs is described. The instrument is easy to use and has an accuracy of ±0.1 mm. Its adavantage over a caliper ruler or other commonly used devices (i.e., measuring boards) is that it allows for measurement of large numbers of specimens in a very short time without loosing accuracy in the individual measurement.

KEY WORDS: Measuring box, hard shelled molluscs, integrated caliper rule, size measurements

INTRODUCTION

Population studies require large number of individual size measurements to obtain representative and statistically sound data (Pauly, 1985; Sparre and Venema, 1987). In most instances, time and manpower is limited, however. The consequence is often that either the number of individual (accurate) measurements taken is too small or that many measurements are taken at the expense of accuracy.

Fisheries scientists and aquaculturists studying the dynamics of mollusc populations know this problem from their field work on vessels, at landing places, at the fish market, or at aquaculture farms. In addition, fisherman and resellers usually do not like to spend hours watching scientists measure their precious shellfish.

The caliper rule seems to be the most accurate measuring device, but the handling can be time consuming, especially when dealing with animals of irregular shape. Other methods such as measuring boards or boxes allow for faster measurements but they are less accurate. In order to overcome this problem we designed a measuring box with an integrated caliper rule which allows for rapid and easy measurement of hard-shelled organisms (Plate 1). Its accuracy is ±0.1 mm, the design is simple, and it is easy to clean. With this device up to 600 snails (*Thais coronata coronata*) can be measured in about 1 h. The original version of this device was a box with a scale and an included slide, which was used by one of us (M. Wolff) to measure commercially harvested *Argopecten purpuratus* in Perú back in the early 80s (Wolff, 1985). It provided fast handling but low accuracy (±1 mm), so we decided to change the design.

CONSTRUCTION OF THE DEVICE

The Box

Acording to the measurements in the diagram (Fig. 1a, b) the box was cut of a solid PVC-block with a CNC milling machine. We used PVC as it is relatively cheap, easy to work, and resistant to seawater. Another advantage is that the finished device weighed little more than 1 kg. At the side where the caliper rule is attached, 3 mm of the PVC-block had to be cut out to provide space for the moving part of the caliper rule (Fig. 1a). Stainless steel screws (M6, 20 mm length) were used for attaching the caliper rule to the box. The attachment was fixed with M5 screws (20 mm) to the movable part of the caliper rule. The holes were drilled with a helicoil drill and helicoil threads were then inserted. These metal threads keep the pitches from wearing out when the caliper rule has to be dismounted for cleaning. Drainage holes (5 mm) were drilled into the bottom of the box. The attachment (Fig. 1d) was also made of PVC, with metal threads inserted into the drill holes, as described above. Rubber patches were glued to the bottom of the box to provide hold on smooth surfaces.

The Caliper Rule

A sturdy caliper rule (stainless steel) of about 300 mm in length was used. A good quality is recommended as it is crucial for the overall stability of the device. After being cut to the desired length, the holes were eroded into the tempered steel, as indicated in Figure 1c. We strongly recommend that the device be professionally made as its accuracy depends on exact construction. A precision engineer can build the device on the basis of the technical drawing (Fig. 1).

USING THE DEVICE

The size of our tool was chosen for animals between 10.0 and 100.0 mm. The main advantage is that the caliper rule is fixed and the attachment provides a large area for measuring animals. Furthermore, the box can be used to position animals correctly, which is sometimes difficult when using a normal caliper rule. Measuring animals has to be done with care, as the attachment is fixed only with two screws and is the most sensitive part of the whole device. Its durability depends largely on how carefully it is used. We had no problems during a 1 ½ year study in northern Brazil where several thousand animals were measured. To keep the metal parts from corroding, a good oil (e.g., Ballistol) should be applied before and after each use. This guarantees smooth action of the movable parts and protects the metal from the seawater.

We are confident that the interested reader will find this instrument very useful.

ACKNOWLEDGMENTS

This study resulted from the cooperation between the Center for Tropical Marine Ecology (ZMT), Bremen, Germany, the Universidade Federal do Pará (UFPa), and the Museo Paraense Emilio Goeldi (MPEG), both Belém, Pará, Brazil under the Gov-

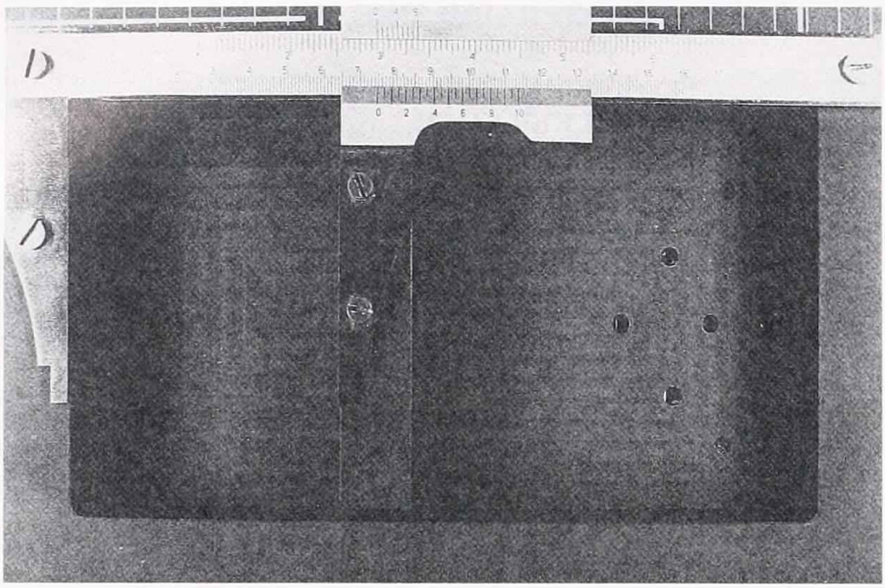

Plate 1. Shows the top view of the finished (and well used) device.

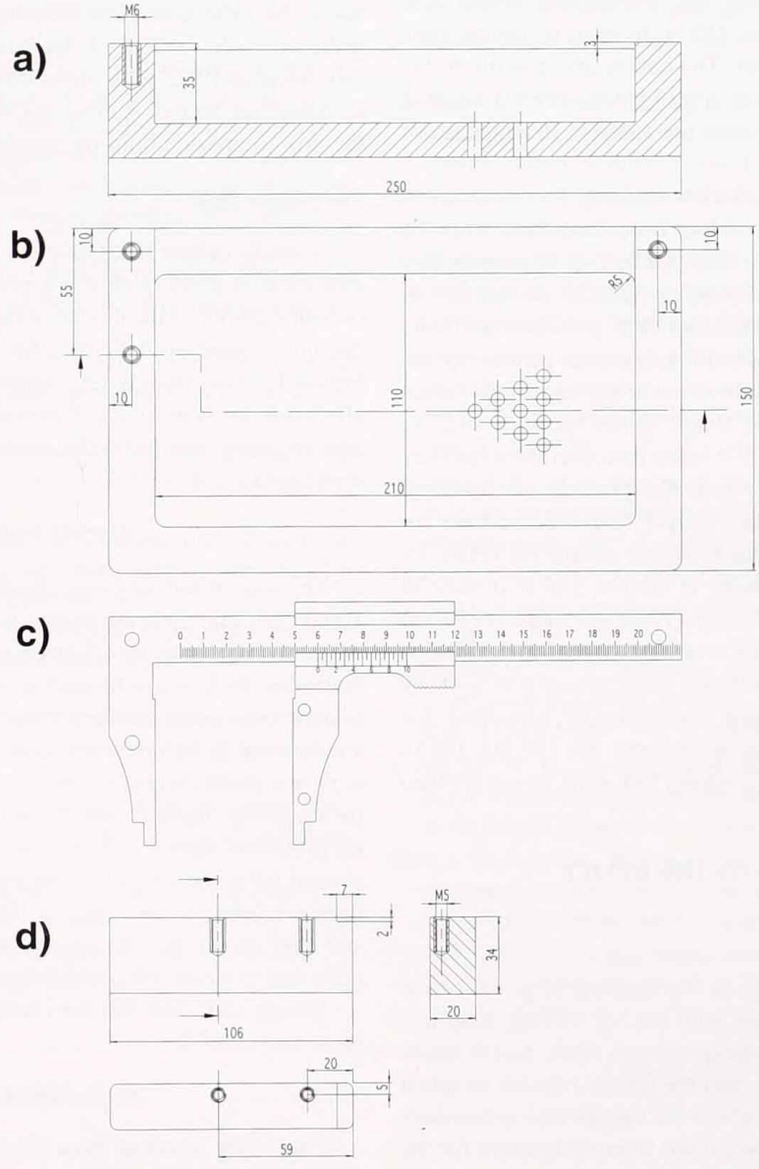

Figure 1. Technical drawing of the device (a) from the side where the caliper rule is attached, (b) from above, (c) drawing of the caliper rule, and (d) of the attachment. All measurements are given in mm.

ernmental Agreement on Cooperation in the Field of Scientific Research and Technological Development between Germany and Brazil. It was financed by the Germany Ministry for Education, Science, Research and Technology (BMBF) [Project Number 03F0154A, Mangrove Dynamics and Management-MADAM].

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