

carried out at pH 3 with distilled water substituted for enzyme extract showed that the high reading at that pH was not due to autolysis of the substrate.

In the second demonstration of proteolytic activity at low pH, mid-guts were dissected from 5-day old flies which had fed on meat. The guts were split longitudinally and the peritrophic membrane tube and contents removed. Each gut was then divided into three parts corresponding to the three zones, fore-mid-gut, mid-mid-gut and hind-mid-gut, the contents of which are buffered (as shown by Waterhouse's range-indicator method⁹) at pH 5, pH 3.6, and pH 8. These fractions were then laid on the surface of a thin milk-agar plate of the type normally used for bacteriological work. The milk-agar medium, which contained thiomersalate to inhibit bacteria, was either buffered at pH 3.6 or pH 8. Preparations were incubated for 24 hr. at 38° C. In the low pH plates a wide zone of clearing developed around the mid-mid-gut. There was also some evidence of an enzyme active at low pH diffusing from the last part of the fore-mid-gut in smaller quantity than that from the mid-mid-gut. Clearing occurred in the immediate vicinity of the hind-mid-gut in pH 3.6 plates, but this appeared to be restricted to the range of the gut cells' own buffering effect beyond which the hind-mid-gut enzyme was obviously inactive. In pH 8 plates a wide zone of clearing developed around the hind-mid-gut. Thus the results of the quantitative tests have been confirmed and it has been shown that the proteinase (or proteinases) active at low pH in the gut of *C. vomitoria* is principally produced by the cells of that zone the pH of which is adjusted to suit such an enzyme.

Female blowflies require protein in their diet in order to produce eggs. Males have no such need, but it is interesting to note that they will feed readily on meat, and the milk-agar plate method indicates the presence of the same enzymes in male as in female intestines.

We thank Drs. J. R. Norris and W. R. Rees of this University for valuable discussions and Dr. Ellen Thomsen, Copenhagen, for the initial suggestions.

ALASTAIR FRASER
RICHARD A. RING
ROBIN K. STEWART

Department of Zoology,
University of Glasgow.

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Home and Distribution of the House Cricket *Acheta domesticus* L.

THE house cricket, *Acheta domesticus*, is generally believed to have moved into Europe and North America from arid and semi-arid areas of northern Africa or south-western Asia¹. However, during my work on *Acheta domesticus* and related species, I have found evidence which suggests that the question regarding the native country and distribution of *A. domesticus* is more complicated.

Colour and size are unreliable taxonomic characters for separating closely related species of crickets, and the species of the *domesticus* group are remarkably uniform in their outward appearance. However, among the male specimens from various parts of the world, identified as *Acheta domesticus* by Chopard, Uvarov, Dirsh, Kevan, Gurney and other specialists. I have found no less than five species which have no significant external morphological differences but can be clearly separated on the basis of their internal male genitalia. Indeed, two of these species have been experimentally shown to be reproductively isolated², but the anatomical reasons for this have only now become clear.

The first step to clear the confusion regarding the taxonomy of the house cricket is to fix the name *Acheta domesticus* L. for one of the five species distinguished in the course of the present studies. The name *A. domesticus*, described from Sweden, should be restricted to the house cricket commonly found in Europe and North America, including the Canadian strain². The males determined on the basis of genitalia were compared with *domesticus* specimens from Sweden, and both sexes taken from the same laboratory-bred stock are being re-described.

Uvarov¹ described on the basis of colour and size *Acheta meridionalis* from Khartoum as a sub-species of *A. domesticus*, and Kevan³ considered it a wild southern form of the same, but the examination of male genitalia shows that *A. meridionalis* (Uvarov) is a distinct species, known to me also from West Aden Protectorate, Egypt and Fezzan. The examination of the male genitalia shows also that the species referred to earlier as the Pakistani strain² is *Acheta hispanicus* Rambur, which I am able to record also from Morocco, Baghdad and West Pakistan. Three more distinct species of the *domesticus* group are known to me from Egypt, East Africa and India.

The specimens of all the species referred to above are preserved in the British Museum (Natural History), London, and their full descriptions, including a re-description of *Acheta domesticus* L. with full synonymy, are ready for publication. Once the identities of the species previously confused with *A. domesticus* are established, it may become possible to build up a better picture of the distribution of the European house cricket (*A. domesticus*), and to determine its native country with greater certainty. The correct identification of these species is also of great economic importance as at least two of them (*A. domesticus* and *A. hispanicus*) are serious pests of irrigated crops in the Indo-Pakistan sub-continent⁴, and with the extension of canal irrigation in the arid and semi-arid regions their potential danger continues to increase. I shall be glad to receive material on these crickets either from houses or collected in the field for further studies.

This work was carried out while I held a research fellowship of the South East Asia Treaty Organization and I am grateful for it, and also to Sir Boris Uvarov and Dr. V. M. Dirsh for their advice and help.

A. S. K. GHOURI

Department of Plant Protection,
Government of Pakistan,
Karachi.

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