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The Cytology of *Ptinus hirtellus* Sturm and its Parthenogenetic Triploid Form *P. latro* Fab.

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ABSTRACT

Breeding experiments at the Pest Infestation Laboratory (D.S.I.R.) indicate that *P. latro* and *P. hirtellus* comprise a single polymorphic species. The male *latro* is unknown. Female *latro* x male *hirtellus* produce *latro* only. In *hirtellus* $2n = 18$; maturation in both sexes and fertilization appear normal. *Latro* is triploid, $3n = 27$; no irregularities are apparent in the two maturation divisions, presumably because a precocious chromosome split occurring in prophase leads to the formation of 27 pseudobivalents with retention of the triploid number. This view is supported by the occurrence in very young oocytes of bouquet stages apparently showing the triploid number of loops. Further, in late oogonial mitoses there is a distinct tendency to separation of chromatids before congression in metaphase. This centromeric anticipation however is also apparent in somatic cells of both male and female *hirtellus*.

The role of *hirtellus* sperm in *latro* development has not yet been fully elucidated. Eggs from virgin females never pass beyond first metaphase. Eggs laid by inseminated females are stimulated to complete maturation by a sperm, or sperms. Haploid nuclei found in certain eggs possibly arise from sperms. Many eggs show abnormal cleavage spindles with laggard chromosomes.

The tentative conclusion is that *P. latro* is a parthenogenetic triploid derived from *P. hirtellus*. Successful completion of maturation in the *latro* egg, however, is apparently still dependent on the presence of the sperm. Gynogenesis occurs as a normal feature of reproduction in certain Turbellaria and Nematodes and has been recorded in an earthworm, but this appears to be only the second record in insects. In the psychid moth *Luffia lapidella* Goeze the parthenogenetic form is inseminated by the male of the bisexual form. The sperm fuses with the egg nucleus but the embryo develops from the diploid polar nucleus (Narbel-Hofstetter, 1955. *La pseudogamie chez Luffia lapidella* Goeze (Lepid. Psychide). Rev. Suisse de Zoologie, 62, Fasc. 2 (No. 9)).

DISCUSSION

J. G. ROBERTSON. Do you know of any hormonal determination of sex in insects?

A. R. SANDERSON (MISS). No—quite uninformed on this.

H. KALMUS. Could Dr. Sanderson tell us something about the geographical distribution of the two races?

A. R. SANDERSON (MISS). The only information I have is in an unpublished paper by R. W. Howe, Slough (D.S.I.R.). Known in America and Europe—in Britain *hirtellus* has been known for the last 100 years.

D. D. MILLER. Are there tissues (or organs) in which cell size could readily be compared between *P. latro* and *P. hirtellus*—such as the compound eyes or wing cells?

A. R. SANDERSON (MISS). I think measurements could be made. As far as I know no statements have been published by the Slough entomologists—Moore & Woodroffe—who discovered the parthenogenesis.

W. C. ROTHENBUHLER. Mackensen and previous workers have reported the production of females by unmated queen honey bees. Would this be another case of gynogenesis?

A. R. SANDERSON (MISS). No. This would be thelytoky. Gynogenesis is a form of parthenogenesis in which the egg requires activation by a sperm. Gynogeny is the production of female offspring. Perhaps it would be less confusing if we used the term "pseudogamy" and dropped the term "gynogenesis".