PRELIMINARY LABORATORY EVALUATION OF *CEPHALOSPORIUM LECANII* ZIMM. AS A PATHOGEN OF BRINJAL LEAF BEETLE, *HENOSEPILACHNA VIGINTI-OCTOPUNCTATA* (FABR)

Cephalosporium lecanii Zimm. often infecting a number of Homopteran insects[1,2] was also found to cause mortality in insects belonging to Coleoptera[2,3] and Lepidoptera[4] because of its non-specific nature. The present study was undertaken with a view to testing its pathogenesis in the brinjal leaf beetle, *Henosepilachna vigintioctopunctata* (Fabr.) (Coccinellidae) which often causes severe defoliation of brinjal and tomato.

Field-collected egg masses after surface disinfection with 1% sodium hypochlorite were allowed to hatch and larvae reared on potted brinjal plants. Each treatment (Table I) was replicated three times with 50 eggs, ten grubs in each of the four instars, ten pupae and ten adults in each replication. *C. lecanii* grown on moist sterile sorghum grains was sprayed by a one-litre hand sprayer at two concentrations, *viz.*, $1{\cdot}6 \times 10^7$ and $4{\cdot}8 \times 10^7$ spores/ml along with Tween 20 at 0·05%. The sprayed larvae and adults were allowed to feed on healthy brinjal leaves inside a petri dish kept over moist filter paper. The eggs and pupae after treatment were also placed on moist filter paper in petri dishes in order to maintain a high humidity. The same number of insects in each stage was included in untreated checks, and water was sprayed in the place of fungal spore suspension. There was no natural mortality.

The cumulative mortality of different stages of the brinjal leaf beetle is presented in Table I. The eggs and adults were not affected by the fungus at both the concentrations attempted, and the larval and pupal stages were susceptible. The grubs showed mortality from the third day onwards which extended upto six days. The first three instars were found to be more susceptible and the percentage mortality increased with the concentration of the fungus spores. At the time of death, infected larvae and pupae became dark brown and the homocoele was partially filled in, with fungal mycelium causing the larvae to become turgid. After 48 h aerial, the mycelium appeared and covered the whole body surface (Fig. 1). Sporulation on the surface of the dead larvae occurred from the seventh day after death. Further studies are in progress to control the pest under field conditions with the pathogen with a view to avoiding problems of pesticide hazard in its chemical control.

TABLE I

Susceptibility of different stages of brinjal leaf beetle, to C. lecanii

Stage	% mortality* at conc. of fungus	
	$1{\cdot}6 \times 10^7$ spores/ml	$4{\cdot}8 \times 10^7$ spores/ml
Egg	0·0 (0·6)	0·0 (0·6)
Grub I instar	36·8 (37·2)	66·7 (60·0)
Grub II instar	40·0 (39·1)	73·3 (64·2)
Grub III instar	46·7 (43·1)	76·7 (65·9)
Grub IV instar	10 0 (15·2)	26·7 (30·8)
Pupa	6·8 (9·2)	16·8 (23·9)
Adult	0·0 (0·6)	0·0 (0·6)
S.E.	(4·1)**	(9·1)**
C.D. (P = 0·05)	(15·7)	(27·9)

* Per cent mortality P; in parentheses are sin $\sqrt{P}$.
** Significant at 1% level.

FIG. 1. Left: Grubs infected with fungus. Right: Healthy insect.

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1. Ganhao, J. F. P., *Broteria*, 1956, **25**, 71.
2. Leatherdale, D., *Entomophaga*, 1970, **15**, 419.
3. Barson, G., *Ann. appl. Biol.*, 1976, **83**, 207.
4. Kobiashivili, B. S., *Trudy Institua Zashchity Rastenii Gruz. S.S.R.*, 1972, **23**, 178.

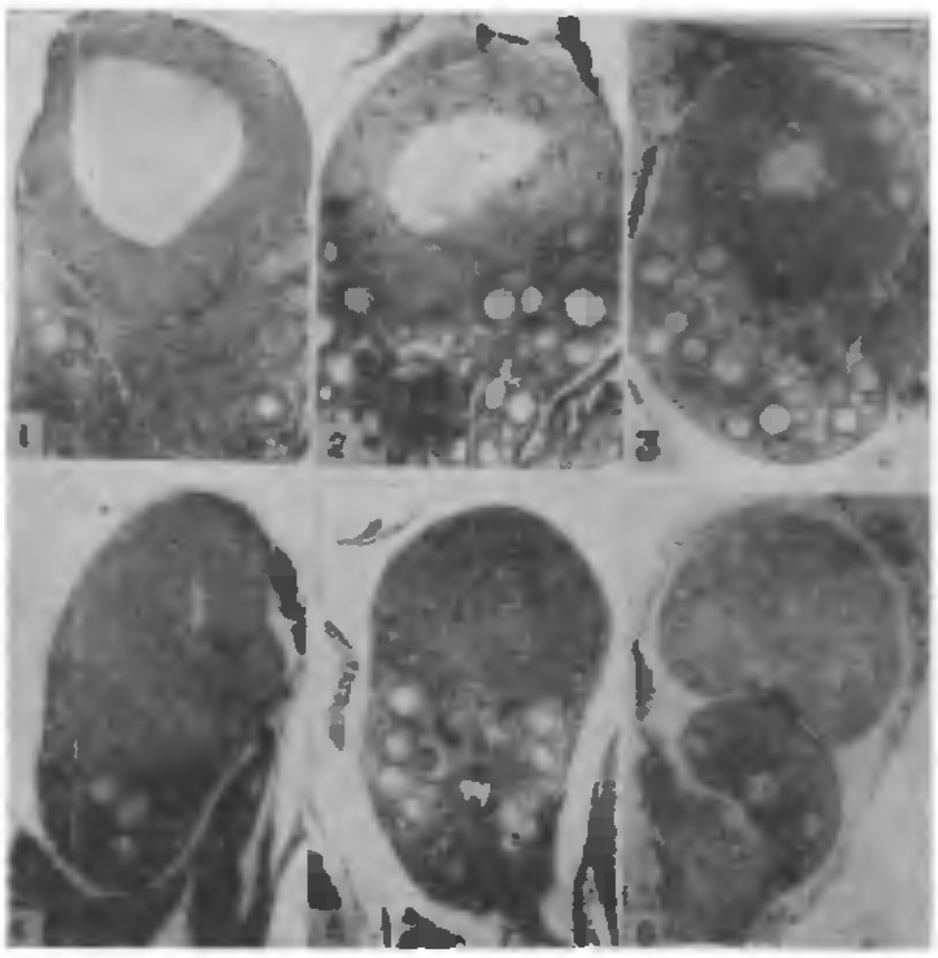
CORPUS LUTEUM IN THE INDIAN RUFUS HORSE SHOE BAT, *RHINOLOPHUS ROUXI* (TEMMINCK)

THE occurrence of an extrovert corpus luteum is rare among mammals and has been reported in *Elephantulus*,[1] *Galago*[2] and the slender loris[3] among the non-chiropteran mammals and in *Rhinolophus hipposideros minutus*,[4] *Rhinopoma kinneari*[5], *Hipposideros fulvus fulvus* and *Megaderma lyra lyra*[6] among bats. While the corpus luteum normally is within the confines of

the ovary in *Rhinolophus ferrum-equinum insulanus* one exceptional specimen with an extrovert corpus luteum was noticed by Matthews[4]. In all the bats in which the corpus luteum is extrovert, the fully formed corpus luteum occurs as a solid knob, often bigger than the ovary, and attached to the ovary by a narrow isthmus. Developmentally also, the extrovert corpus luteum is different from the normal corpus luteum which lies within the confines of the ovary. In the extrovert corpus luteum there is no central blood clot formed in the ovulated follicle, and the granulosa layer gets outfolded and appears to flow out of the ovary. In most of the bats, where the corpus luteum lies within the confines of the ovary, there is a central cavity in the Graafian follicle immediately after ovulation, and this gets filled by blood[7–10]. The granulosa cells grow inwards and fill up the central blood-filled cavity. The corpus luteum enlarges, and sometimes occupies the major part of the ovary at its highest stage of development. It, therefore, appears that, apart from the morphological difference, there is also a developmental difference between the normal corpus luteum and the extrovert corpus luteum, the former normally having initially a central cavity, which becomes filled by the ingrowing granulosa cells, and the latter having no central cavity at any stage of its development.

While studying the details of the reproductive cycle of the Indian rufus horse shoe bat, *Rhinolophus roxi*, the author noticed that the corpus luteum in this bat developed in a manner so far not described in any bat. Within a short period after the release of the ovum there is a large central cavity within the ovulated Graafian follicle (Fig. 1). The granulosa cells hypertrophy and also multiply with the result that the central cavity becomes progressively filled up (Figs. 2–4) and the corpus luteum as a whole enlarges enormously and grows out of the ovary (Fig. 5). At its highest stage of development it occurs as a solid, nearly spherical bulb attached to the ovary by a short narrow stalk (Fig. 6). The corpus luteum at this stage is considerably larger than the rest of the ovary. The corpus luteum reaches its maximum size during early gestation after which it regresses rapidly and is completely lost by mid-pregnancy.

From the above it is evident that the corpus luteum of *Rhinolophus roxi* presents developmental features which are a combination of the developmental features of the extrovert corpus luteum and the normal included corpus luteum. However, the corpus luteum of *Rhinolophus roxi* cannot be considered as an extrovert corpus luteum in the strict sense of the term since this is not formed by the out-folding of the granulosa layer as is the case with the truly extrovert corpus luteum. It should be considered as an example of a pedunculated corpus luteum, which has formed by the out-growth of the corpus luteum from the surface of the ovary and remains attached to the ovary by a distinct stalk. It is, thus, necessary to recognize a third kind of corpus luteum—the pedunculated corpus luteum—as illustrated by *Rhinolophus rouxi*, in addition to the extrovert corpus luteum and the normal included corpus luteum which remains within the confines of the ovary.



FIGS. 1–6. Stages of the development of the corpus luteum of *Rhinolophus rouxi* (Please see text for descriptions). × 88.

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1. Horst van der C. J. and Gillman, J., *S. African J. Med. Sci.*, 1940, **5**, 73.
2. Butler, H., *Proc. Zool. Soc. London*, 1957, **129** (1), 147.
3. Ramaswami, L. S. and Kumar, A., *Acta Zool.*, 1965, **46** (3), 257.
4. Matthews, L. H., *Trans. Zool. Soc. London*, 1937, **23**, 224.
5. Kumar, A., *J. Zool.*, 1965, **147** (2), 147.
6. Gopalakrishna, A., Patil, D. R. and Nagarajan, R. *Curr. Sci.*, 1970, **39**, 436.
7. —, *Proc. Indian Acad Sci.*, 1949, **30** (1). 17.
8. Pearson, O. P.; Koford, M. R. and Pearson, A. K., *J. Mammal.*, 1952, **33**, 273.
9. Wimsatt, W. A. and Trapido, H. T., *Amer. J. Anat.*, 1952, **91**, 415.
10. Gopalakrishna, A., *Proc. Nat. Inst. Sci. India*, 1955, **21**, 29.