DISCOVERY OF EGGS AND FUNDATRIX OF 
APHIS SP. FROM INDIA (HOMOPTERA: 
APHIDIDAE)

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Over 700 aphid species are so far known from India\(^1\) 
but not a single species was known producing eggs 
although sexuales of 80 species were recorded from 
this country\(^2\). True holocyclic life cycle i.e. sexual 
reproduction followed by parthenogenetic genera-
tions in aphids is largely unknown from India except-
ing a few aphid species\(^3,4\) of which fundatrices have 
been recorded. Fundatrix is hatched out from the egg 
and is a definite proof of holocyclic life cycle in aphids.

In the course of aphid exploration in Kumaon 
Range during December 1979 some very short woody 
plants (represented only by stem and a few dried 
leaves of Cestrum Sp.) supporting egg masses (figure 
1) were found in the hills of Nainital. Each egg was 
brown in colour, oval in shape and about 1 mm in 
length and 0.55 mm in width (figure 2). It remained 
glued to the stem surface by a kind of transparent 
fluid. This fluid was, perhaps, secreted by the ovipar-
ous female from its accessory gland for gluing eggs to 
the substrate or provinding them with a protective 
covering, a common phenomenon in insects\(^5\).

Figure 1. Egg masses (natural size) 2. A single egg 
(× 30) 3. Fundatrix (×30).

Further search on the same plants during March 
1980 revealed the occurrence of fundatrices feeding on 
the plant. Empty cases of eggs were also seen attached 
to the plant. Each fundatrix was brown in colour 
about 1 mm in length and 0.6 mm in width (figure 3) 
and remained stationary on the plant. At this stage the 
plants bear more leaves.

Subsequent search on the same plants in the following 
months did not lead to any finding of aphids which 
suggests that aphid leads a dioecious type of holocyclic 
life cycle. It is presumed that emigrant forms which 
emerged from the fundatrices left for some secondary 
hosts which could not be located.

The microscopic examinations of the fundatrix 
revealed it, to be a species of Aphissp. The plant could 
not be definitely identified because the specimens were 
without healthy leaves and no flower. The present 
record of eggs of an aphid species is the first from 
India. This finding, together with earlier findings 
of fundatrices of some aphids suggests that at least some 
aphid species leads holocyclic life cycle under Indian 
climatic conditions. These findings have important 
bearings on the taxonomic and biological studies on 
aphids.

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BURSA KINETICS DURING EXPERIMENTAL 
ANCYLOSTOMIASIS IN CHICKENS

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The migration and the distribution of Ancylostoma 
caninum larvae have been studied\(^1,3\) in various organs 
and muscles of mice after oral infection with various 
doses. The migration and distribution of larvae in 
various organs of chickens have also been studied\(^3,4\). 
Goyal et al\(^6\) found the weight gain in bursa and spleen 
during experimental ancylostomiasis in W.H 
chickens. This paper presents an account of bursa 
kinetics, i.e. changes in absolute and relative weights 
of bursa in control and challenged chickens (given a 
dose of 2000 filiform larvae of A. caninum).

One-day old, Ranishaver male chickens (canadian 
star-cross 288), obtained from Sarkure Hatcheries,
Hirapur (Tatiband, Raipur) were used throughout for experimental infection. Chickens of group A were not given any larval dose and were used as controls, while those of group B were administered, per os, uniformly 2000 filariform larvae of *A. caninum*. Changes in absolute and relative weights of bursa (mg per 10 g of body weight) were recorded in both groups of control and challenged chickens, 4 hourly until 12 hr, 6 hourly until 24 hr, 12 hourly until 48 hr, at 72 hr and subsequently at every 4 days interval until 120 days, when chickens attained sexual maturity. Three sets of these experiments (38 in each group of control and challenged chickens) were performed and mean values of absolute and relative weights of bursa in control and challenged chickens of different ages were calculated.

Absolute weight increases of bursa with growth from 43.7 mg (one day-old) to 1018 mg (120 days old) in control and from 47.7 mg (one day-old) to 1048 mg (120 days old) in challenged chickens. This increase in bursal weight is noticeable from 3rd to 14th week in both the groups. Comparatively, this increase is more in challenged group than in control group of chickens (figures 1 and 2). There is neither plateau period nor any regression period. Relative weight of bursa (mg

Figure 1. Absolute weight of bursa at different intervals until 72 hr.

Figure 2. Absolute weight of bursa at every 4 days interval until 120 days.

Figure 3. Relative weight of bursa at different intervals until 72 hr.
CONTRIBUTIONS TO THE REPRODUCTIVE BIOLOGY OF THE FERN *LYGODIUM FLEXUOSUM* (L.) SW.

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*Lygodium flexuosum* is a climbing fern and grows in many natural and artificial Teak-Sal forest of India at lower altitudes. In Mirzapur district it is sparingly found in a Sal forest called Hathinallah and in Gorakhpur it is rather abundant in Teak-forest called Kusumhi. The distribution of the fern, though never growing in plenty in any one place throughout India, is interesting and therefore a study of the mating system and distribution of *L. flexuosum* was undertaken.

The spores were collected from both the sources mentioned above and stored in a desiccator and then surface sterilized with 2% sodium hypochlorite solution before sowing on 50 ml of autoclaved sterilized inorganic nutrient medium1 gelled with 1% agar at pH 5.8 in petridishes. The plates were maintained at 24 ± 2°C under continuous-white fluorescent illumination at an intensity of 250–300 ft. C in a culture room. Immature prothalli were randomly selected and were placed in fresh solidified nutrient agar medium in petridishes to give rise to three kinds of population, namely, single, pair and composite. Crossing programme for the gametophytes is mentioned below.

A : Consisted of 21 singly isolated gametophytes from Hathinallah.
B : Consisted of 26 singly isolated gametophyte from Kusumhi.
A × A : Consisted of 24 pairs of gametophytes from Hathinallah.
B × B : Consisted of 20 pairs of gametophytes from Kusumhi.
A × B : Consisted of 20 crosses of gametophytes. Each plate contained two gametophytes, one from Hathinallah and other from Kusumhi.
A' × B' : Consisted of 25 composite cross-cultures. Each plate contained 20 gametophytes, half from Hathinallah and the other half from Kusumhi.

After attaining sexual maturity the cultures were subsequently watered twice weekly with sterilized double distilled water to facilitate fertilization and zygote formation was scored till the termination of experiment. Two sets of stock-culture were left unwatered to serve as apogamous control. At the end of the experiment those gametophytes which failed to produce a sporophyte were examined morphologically for the presence of male, female gametangia and indi-

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Figure 4. Relative weight of bursa at every 4 days interval until 120 days.

per 10 g of body weight) also steadily increases with growth from 15.1 mg (1 day-old) to 19.4 mg (76 days old) in control and from 16.6 mg (1 day-old) to 19.6 mg (72 days old) in challenged group of chickens. Relative weight then tends to decrease steadily after 30 days in control and 76 days in challenged group until sexual maturity at 120 days (figure 3 and 4). Increase in relative weight in challenged group of chickens, however, is more obvious than in control group at each stage of sacrifice.

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