CHAPTER IV

CYTOLOGICAL OBSERVATIONS
The adipose cells or the trophocytes of the different insect orders, differ from one another in their shapes and sizes. They are almost rectangular or hexagonal in shape. The intercellular membrane is visible in all insects studied, but, in some stages of development it is not clearly marked due to the abundance of stored reserves. In the adipose cells the central globules are conspicuous and between them, cytoplasmic strands are clearly noticed. The peripheral globules are observed in these strands. Dot-like mitochondria are also seen.

Each nucleus of the adipose cell contains 1 or more nucleoli.
Order - *Thysanura*

(a) *Lepisma collaris*:

The intercellular membrane is not clearly visible. However the size of the cell and the nucleus has been observed to be about 24.4 μ to 25.0 μ and about 8.3 μ to 9.7 μ respectively, while the nucleolus is about 1.4 μ in size. The mitochondria are present in the peripheral part of the cells.

(b) *Brachythemis centuminata*:

In this insect too, the cell boundary is not very clearly distinct. The average diameter of the cell is about 30.5 μ to 32. μ. Average size of the nucleus is about 11.0 μ to 12.0 μ and that of the nucleolus is 2.1 μ. The rod like mitochondria are clearly visible at the border of the cells.

(c) *Sphaerodema rusticum*:

The intercellular membrane is quite clearly visible. The size of the fat cell in the male is slightly bigger than that of the female but the diameter of the nucleus is the female is more as compared to the values found in the male. The diameter of the cell in the male is about 26.3 μ to 28.0 μ and the size of the nucleus is about 7.0 μ to 8.3 μ, while in the case of the female the size of the cell and nucleus is about 25.0 μ to 26.3 μ and 8.3 μ to 9.7 μ respectively. The nucleolus size has been observed to be about 2.1 μ for male and 2.7 μ for the female. Small Rod-shaped mitochondria are more in the female
while they are less in number in the case of the male.

(d) *Cyclopelte siccifolia*:

The intercellular membrane could be clearly noticed in this insect species. The cell and nuclear size of the male *Cyclopelte* is about 33.3 μ to 34.7 μ and 6.9 μ to 8.3 μ respectively. In the female insects, the cell size is comparatively small than that of the male, but the nucleus in the female is bigger. The diameter of the cell has been observed to be about 30.5 μ to 33.3 μ while the nucleus is about 9.0 μ in size. In the male insect the nucleolar size is about 2.1 μ while in female it is about 2.8 μ. In the female dot like mitochondria are more in number and they are less in the male.

(e) *Dysdercus similis*:

The intercellular membrane of the cell is clearly marked. Here also the cell size has been observed to be bigger in the male than the cell size of the female but nucleus is smaller in the male. In the female the diameter of the cell and nucleus is about 19.4 μ to 20.8 μ and 8.3 μ to 9.7 μ respectively. While in the male, the cell is about 22.0 μ to 23.5 μ and nucleus is about 7.0 μ to 8.3 μ in size. The nucleolus size has been observed to be about 2.1 μ in the males and 2.7 μ in the females. The number of rod shaped mitochondria is less in the case of males while it is more in females.
Order - Lepidoptera

(f) Phthorimaea operculella:

The intercellular membrane is clearly observed. The size of the cell and the nucleus in the male is about 19.4 µ to 20.8 µ and 6.9 µ respectively. The cells of the female are slightly smaller than those of the male but the nuclei are bigger in females. In the females, the cells are about 16.6 µ to 17.0 µ while nuclei are about 8.3 µ in size. In the peripheral part of the cells, rod like mitochondria are present which are less in number in the case of males and more in the case of females.

(g) Syntomis ocyse:

In Syntomis the intercellular membrane is clearly marked. The size of the cell and nucleus are noticed to be about 19.4 µ to 20.8 µ and 6.9 µ to 8.3 µ. The number of dot like mitochondria are less than that of females.

The female Syntomis has smaller cells but with big nuclei. They measured to be about 18.0 µ to 19.4 µ and 8.3 µ to 9.7 µ respectively. The nucleolus size in male and female is about 2.0 µ and 2.7 µ respectively.

(h) Hapalia Sp.:

The adipose cells of Hapalia sps. contain intercellular membrane. The diameter of the cell and the nucleus is about 18.4 µ to 20.8 µ and 5.5 µ to 6.9 µ respectively. The
The size of nucleolus in male and female is about 1.39 µ and 2.1 µ respectively.

In the female, the size of the cell has been noted to be about 16.6 µ to 18.0 µ while that of the nucleus is about 8.3 µ to 9.7 µ. The number of mitochondria is more in females than males.

(1) *Digama hearseyana*:

Intercellular membrane is clearly visible. The diameter of the cell in the male is about 19.4 µ to 20.8 µ and the nucleus is about 5.5 µ to 6.9 µ in size. Here, in the male insects, dot-like mitochondria are less in number than in the female.

In the female, the size of the cell and the nucleus is about 17.0 µ to 19.4 µ and 7.0 µ to 8.3 µ, respectively. The size of nucleolus in male and female measured to about 1.4 µ and 2.1 µ respectively.

(2) *Ribosa obducta*:

In the adipose cell, the intercellular membrane is visible. The size of the cell and the nucleus in the male is about 18.0 µ to 19.4 µ and 5.5 µ to 6.9 µ respectively. The nucleolus size in male and female is about 1.4 µ and 2.8 µ respectively.

In the female insect the size of the cell and the nucleus is about 16.6 µ to 17.0 µ and 7.0 µ to 8.3 µ. In the female
insects the number of rod like mitochondria is more than in the male.

(k) *Semiothisa eleonora*:

The intercellular membrane is visible. In the male insect the diameter of the cell and the nucleus has been noticed to be about 22.2 μ to 23.5 μ and 6.9 μ to 8.3 μ respectively.

The average diameter of the cell in the female is smaller and is observed to be about 16.6 μ to 18.0 μ and the nucleus is about 8.3 μ to 9.7 μ. The size of nucleolus in the male and female is about 2.1 μ and 2.77 μ respectively.

(l) *Grammodes stolida*:

The intercellular membrane in the cells could be observed very clearly. The size of the cells in the male is bigger than that of the female. In the males the cells are about 22.0 μ to 24. μ while the female cells are about 16.6 μ to 17.0 μ.

The nucleus in the female has been noted to be bigger as compared to the male nucleus. In the females the nucleus is measured to be about 8.3 μ to 9.7 μ while in the male, it is about 6.9 μ to 8.3 μ.

Likewise, the female nucleolus is bigger than the male nucleolus. The measured value for the female nucleolus is about 2.07μ and for the male nucleolus it comes to 1.4 μ.
(m) *Epipasis concellalis* :

The intercellular membrane is clearly marked. The cells are observed to be about 17.0 μ to 19.4 μ and the nucleus is about 5.5 μ in size.

In the female, the size of the cell and the nucleus has been observed to be about 15.2 μ to 16.6 μ and 8.3 μ respectively. The size of nucleolus measures about 1.38 μ in male while it is about 2.1 μ in female.

(n) *Thalassodes* Sp. :

The intercellular membrane in the cell is visible. The female cells are slightly smaller than the males and are about 16.6 μ while male cells are noticed to be about 18.0 μ to 19.0 μ. The nucleus and nucleolus in the female has been observed to be bigger than in the male. In the female the size of the nucleus and nucleolus has been 6.9 μ to 8.3 μ and 2.1 μ respectively. While in the males it comes to 5.5 μ to 6.9 μ and 1.04 μ respectively.

(o) *Papilio demolius* :

The intercellular membrane is visible in the cells. The diameter of the cell and the nucleus is about 24.4 μ to 25.0 μ and 6.9 μ respectively.

In the female insects, the cell size has been observed to be about 22.1 μ to 23.5 μ and the nuclear size is about 8.3 μ.
The nucleolus in the female is about 2.7 μ in size while in the male it is 2.08 μ. The number of mitochondria which are rod shaped is more in the case of females than in males.

(p) _Euploea core_

The intercellular membrane here also, is clearly demarcated. The diameter of the cell and the nucleus in the male insect is about 24.4 μ to 26.0 μ and 5.5 μ to 6.9 μ respectively. Here the number of rod like mitochondria is less in male as compared to female.

The nucleus and the nucleolus in the female have been observed to be bigger while the cell is smaller in size. The observed values for the cell size, nuclear size and nucleolus sizes are 23.5 μ to 24.9 μ, 7.0 μ to 8.3 μ and 2.07μ respectively.

(q) _Delia eucharis_

In _Delia_ also, the intercellular membrane is clearly visible. As has been observed in a number of other insect species, the diameter of the cell in the male is bigger than that of the female, while the nuclear and nucleolar size is smaller in the male.

In the males the cell size, nuclear size and nucleolar sizes are 19.4 μ to 20.8 μ, 5.5 μ to 6.9 μ and 0.8 μ respectively, while in the female the cell size, nuclear size and nucleolus size comes to 16.2 μ to 16.6 μ, 7.0 μ and 1.04 μ.
(r) Danais chrysippus:

(a) Caterpillar: - The intercellular membrane is present in the cells of the adipose tissue of Danais.

The size of the cell has been observed to be about 19.4 μ to 20.8 μ and that of the nucleus is about 5.5 μ to 6.9 μ. In the peripheral part of the cell the number of rod like mitochondria is more.

(b) Adult: - The adipose cells of the adult also have a marked intercellular membrane.

The cells in the males are bigger as compared to the female cells. In the males, the cells are about 22.0 μ to 23.5 μ in size, and in the females they are about 19.4 μ to 20.8 μ.

The nucleus and nucleolus are measured to be about 6.9 μ and 2.07 μ respectively. In the female the number of rod like mitochondria is more as compared to a male.

Order - Diptera

(s) Drosophila Sp.

(a) Maggot: - The intercellular membrane in the adipose cells could be observed. The number of rod shaped mitochondria is more at the peripheral part of the cells.

The size of the cells are noted to be about 47.0 μ to 48.4 μ while nucleus is about 11.0 μ to 12.5 μ. The nucleolus is about 2.8 μ.
(b) Adult: The intercellular membrane is clearly divisible. The diameter of the cell and the nucleus has been observed as 22.0 μ to 23.5 μ and 6.9 μ to 8.3 μ respectively. The nucleolus is smaller than that of the maggot and is about 2.07 μ. Rod-like mitochondria are present at the border of the cells.

(t) Sarcophaga lineatocollis:

(a) Maggot: The adipose cells are marked by a clearly divisible intercellular membrane. The cell size and the nuclear size is about 69.2 μ to 70.6 μ and 25.0 μ to 26.3 μ respectively.

The nucleolus is about 5.5 μ in size. The mitochondria which are rod shaped are present at the peripheral zone of the cells.

(b) Adult: In the adult males the adipose cell membrane is quite distinct. The diameter of the cell and nucleus has been noticed to be about 26.3 μ to 28.4 μ and 5.5 μ respectively. The cells of the female adipose tissue are smaller and are about 24.9 μ to 26.3 μ in size while the nucleus and nucleolus have been observed to be about 6.9 μ and 1.04 μ respectively. The number of mitochondria is more in the case of females as compared to males.

(u) Mosquito larva:

The intercellular membrane is present in the adipose cells.
The diameter of the adipose cell and nucleus has been measured to be about 22.0 \( \mu \) to 23.5 \( \mu \) and 6.9 \( \mu \)\( \), while the nucleolus is about 1.04 \( \mu \) in size. The mitochondria are present in the central and peripheral part of the cells.

Order - Hymenoptera

(v) Xylocopa litipes:

The adipose cells of the Xylocopa are clearly marked by the presence of an intercellular membrane. The diameter of the cell and nucleus in the male insect is about 38.8 \( \mu \) to 40.2 \( \mu \) and 13.4 \( \mu \). The nucleus is about 2.7 \( \mu \) in size.

In the female, the size of the cell and the nucleus is about 33.2 \( \mu \) to 34.5 \( \mu \) and 16.6 \( \mu \) respectively. The nucleolus in the female adipose cells are bigger in comparison to the male nucleolus. It is about 3.4 \( \mu \) in size. The number of dot like mitochondria is more in females than in the males.

Order - Coleoptera

(w) Aulacophora foveicollis:

The intercellular membrane is present in the adipose cells. The diameter of the cell and the nucleus has been observed to be about 27.7 \( \mu \) to 29.0 \( \mu \) and 9.7 \( \mu \) to 11.0 \( \mu \) respectively. The nucleolus here is about 2.08 \( \mu \) in size. The mitochondria are present at the peripheral part of the cell.

(x) Cybister limbatus:

The adipose cells are demarcated by a clearly
divisible intercellular membrane. In the females, the cells are smaller than in the male. The female adipose cells are about 32.2 to 34.6 μ while the nucleus, which is bigger in the case of female is about 8.3 μ to 9.7 μ. In the male insect the mitochondria are less in comparison to females.

In the male, the adipose cells are about 34.6 μ to 36.0 μ and the nucleus is about 6.9 μ to 8.3 μ. The nucleolus in the female is about 2.07 μ while in the male it is about 1.04 μ in diameter, i.e., about half the size of the nucleolus of the female

**Cytological Changes During Metamorphosis:**

Cytological changes have been observed in detail in different developmental stages in the two species - *Danais chrysippus* and *Sarcophaga lineatocollis*.

(1) *Danais chrysippus*:

(a) **1 Day Old Caterpillar**:

The diameter of the cell in the one day old maggot has been observed to be about 19.4 μ to 20.8 μ while the nucleus is about 5.5 μ to 6.9 μ in size. The nucleolar size is about 1.39 μ. The number of mitochondria are more at the peripheral part of the cell.

(b) **3 Days Old Caterpillar**:

On this day, in the life of maggot, the size of the cell is about 27.7 μ to 30.4 μ i.e., the size of the cells have increased slightly. A corresponding increase in the nucleus
and nucleolus has been observed to be about 8.3 µ to 9.7 µ and
2.1 µ respectively. The number of mitochondria, which are present
at the peripheral part of the cells are slightly less.

(c) 5 Days Old Caterpillar:

On the fifth day, a further increase in the cell
size, nucleus size and nucleolus size could be noticed and they
are observed to be about 35.0 µ to 36.3 µ, 9.7 µ to 11.0 µ and
about 2.7 µ respectively. The number of rod like mitochondria
is much less.

(d) 1 Day Old Pupa (Male):

In the one day old pupa a slight decline in the
cell diameter value has been observed, accompanied by a decline
in the nucleus and nucleolus diameter.

The cell diameter has been observed to be about 27.7 µ
to 28.4 µ while the size of the nucleus and nucleolus has been
noted to be 5.5 µ to 6.9 µ and 1.39 µ respectively. The number
of mitochondria is very much less.

(e) 4 Days Old Pupa (Male):

No marked difference could be observed in the
adipose cell size of the four days old male pupa when compared
with the one day old pupal stage. The nucleus and nucleolus have
been observed to be about 5.60µ and 1.0 µ respectively. The
number of mitochondria is much less.
(f) **4 Days Old Pupa (Female):**

In the female, the size of the nucleus and nucleolus is about 4.0 μ and 1.39 μ respectively. The cell boundary is not distinct. The distribution of mitochondria is rare.

(g) **6 Days Old Pupa (Female) (Before Moulting to Adult Stage):**

In this stage also, the cell boundary is not clearly distinct, hence it could not be possible to measure the size of the cells. The nucleus is irregular in its shape and has been observed to be about 40 μ in diameter. The nucleolus is not distinct at this stage. Thus, this stage is comparable to 4 days pupal stage in male except that the nucleolus is not visible.

(h) **Newly Emerged Adults:**

(a) **MALE:** In the male insects, the adipose cell is about 22.0 μ to 23.5 μ in size. The nucleus which is irregular in its shape has been observed to be about 5.5 μ. The nucleolus is not clearly distinct. The number of mitochondria is much less as compared to females.

(b) **FEMALE:** In the newly emerged females the cells are slightly smaller and are about 19.4 μ to 20.8 μ in size. The diameter of nucleus is about 6.9 μ. Here also, the nucleolus is not clearly noticed.

(i) **1 Day Old Adult:**

(a) **MALE:** In this stage the diameter of the cell does not alter much, but the nucleus has increased in its size
and is about 5.5 μ. The nucleolus is clearly distinct and is about 0.7 μ in diameter.

(b) FEMALE: - In one day old female, the size of the cell has increased from its previous level of the newly emerged stage and has been observed to be about 22.5 μ. The nucleus and nucleolus has been measured to be 6.9 μ and 1.0 μ respectively.

(j) 3 Days Old Adult:

(a) MALE: - In this stage, the size of the cell and nucleus has been observed to be 24.9 μ and 5.5 μ respectively. The nucleolus size is about 1.0 μ.

These readings clearly show that marked differences could not be seen in this stage.

(b) FEMALE: - A decline in the size of the cell is observed in the three days old adults. The respective values for the cell size, nuclear size and nucleolar sizes are 24.9 μ, 7.0 μ and 1.39 μ respectively. The distribution of mitochondria is more in the female as compared to males.

(II) SARCOPHAGA LINEATOCOLLIS:

(a) 3 Days Old Maggot:

The intercellular membrane, at this stage is clearly visible. The diameter of the cell and the nucleus is about 62.9 μ to 70.6 μ and 25.0 μ to 26.3 μ respectively. The nucleolar size has been measured to be about 5.5 μ. The cytoplasmic strands are clearly seen.
(b) 5 Days Old Maggot:

An increase in the size of the cell, nucleus and nucleolus could be observed. The cell size has been observed to be about 91.4 μ to 92.8 μ. The diameter of the nucleus and nucleolus has been noted to be about 27.7 μ and 6.9 μ respectively. The cytoplasmic strands are clearly noticed. The mitochondria which are rod shaped are present at the peripheral part of the cells. These are more in number.

(c) 7 Days Old Maggot:

On this day, also, the cytoplasmic strands are clearly visible. A decrease in the cell size, nuclear and nucleolar size could be observed. The cell and nucleus have been observed to be about 82.0 μ to 84.5 μ and 19.3 μ to 20.7 μ respectively while the nucleolus is about 5.5 μ in diameter. The number of rod shaped mitochondria is slightly less as compared to 5 days old stage.

(d) 9 Days Old Maggot:

In this stage the diameter of the cell and the nucleus is about 70.6 μ to 72.0 μ and 19.4 μ respectively. The nucleolus is about 5.5 μ in size. It is apparent from the observation that the cell size has decreased again, but we don't find any change in the nuclear and nucleolar size. The number of mitochondria is much reduced.

(e) Newly Moul ted Pupa:

In the newly pupated fly, a decrease in the cell size is observed, which comes to 67.5 μ to 69.0 μ. The
intercellular membrane is visible. The size of the nucleus and nucleolus has been observed to be about 19.4 μ to 20.8 μ and 4.4 μ respectively. The distribution of mitochondria is less than 9 days old stage.

(f) 2 Days Old Pupa:

In the two days old pupal stage, the intercellular membrane is clearly noticed. The size of the cell is about 69.3 μ to 70.6 μ. The nucleus could be marked clearly and it is about 18.4 μ in diameter.

(g) 3 Days Old Pupa:

On this day, the intercellular membrane is not visible. Likewise the nucleus and nucleolus could not be clearly marked. The distribution of mitochondria is very scarce.

(h) Newly Emerged Adult:

(a) MALE:- The cell size of the adipose tissue in the male Sarcophaga has been observed to be about 26.3 μ to 28.4 μ. The nucleus and nucleolus diameter has been noticed to be about 5.5 μ and 1.4 μ respectively, i.e. a sharp decrease in the cell size, nucleus size and nucleolus size is observed.

(b) FEMALE :- In the female too, a sharp decrease is observed in the cell size, nucleus size and nucleolus size. The observed values are 24.9 μ to 26.3 μ for cell size; 6.9 μ for nucleus size and 2.01 μ for the nucleolus size. The number of small rod like mitochondria is less in females than in the males.
1 Day Old Adults:

(a) MALE: - The cellular and nuclear diameters do not change much and have been observed to be about 27.0 μ to 28.4 μ and 5.5 μ to 6.9 μ respectively. The size of the nucleolus is about 1.39 μ.

(b) FEMALE: - In the female, the cell size, the nucleus and nucleolus size values are similar to those observed for newly emerged female adults.

3 Days Old Adults:

(a) MALE: - In this stage also, no very marked changes could be observed in the cell size. The cell size has been noted to be about 27.7 μ to 29.0 μ while the nucleolus is about 2.01 μ and nucleus is about 8.3 μ.

(b) FEMALE: - In the case of female of the same age, the cell size has been observed to be about 27.7 μ while the nucleus and nucleolus sizes are measured to about 9.7 μ and 2.7 μ respectively.

5 Days Old Adults:

(a) MALE: - In the five days old adult males, the size of the cell is about 27.7 μ to 28.4 μ. The average diameter of the nucleus and nucleolus is found to be 7.0 μ and 1.39 μ respectively.

(b) FEMALE: - Although cells are slightly smaller in the female, the nucleus and nucleolus have been observed to be
bigger as compared to the male. The observed values are 24.0 μ to 25.3 μ for cell size, 8.3 μ for nucleus size and about 2.7 μ for the nucleolus size.

THE NATURE OF THE GLOBULES IN THE CELLS OF ADIPOSE TISSUE:

In the adipose cell, the nucleus is surrounded by two types of globules - the bigger central globules and the smaller peripheral globules.

In the Osmium fixed ethyl gallate stained sections of fat body, it is clearly seen that both of these are covered by delicate membranes. In the cell cytoplasm, dot like (granular) mitochondria are observed. This has also been noticed in the fat cells of *Schistocerca* by Odhambo (1967). The central globules are bigger in males while they are small in the females. Peripheral globules are in communication with one another with the help of very thin cytoplasmic strands. The small central globules have a crowd of peripheral globules in the periphery of the cells while the big central globules in the centre of the cell are surrounded by a few peripheral globules. In some insects, in the case of male, peripheral globules are not found around the central globules.

In all insects the central globules stain for lipids while the peripheral globules stain for glycogen, RNA and phospholipids.

MITOCHONDRIA:

In the adipose sections stained by Osmium/Ethyl gallate the mitochondria are noticed to be present at the periphery of
the cell, as numerous dot or small rod like structures. These are found near the peripheral globules which are also very prominent at the outer periphery of the cells.

The exact number of these mitochondria could not be made out due to the overlying globules. However it has been noticed that the number of these mitochondria is less in the male as compared to the female. In the female the mitochondria are abundant near the protein granules in peripheral part of cells and are less in the central part of cells.

It has been also noted that there is a slight change in the number of mitochondria during the successive stages of the development. These dot like mitochondria are more in number at the edge of the cell and also in the cytoplasmic strands. These mitochondria appear crowded when the peripheral globules are smaller, but when these peripheral globules are big the mitochondria are sparsely distributed. However when the protein granules are prominent the mitochondria are clearly visible.

In the larval stage of both insects i.e. Danais chrysippus and Sarcophaga lineatocollis the mitochondria are in abundance at the periphery and central part of the cell but in late larval stage the number of these mitochondria are less. In the pupal stage these are very much lesser. In the adult stage the mitochondria are more in females as compared to males.

The cell measurements of adipose tissue of the different insects studied have been given in Tables 4, 5 and 6).
TABLE - 4 : Showing Cell Measurements of Adipose Tissue of Insects belonging to Different Orders

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the Insects</th>
<th>Order</th>
<th>Cell Size</th>
<th>Nuclear Size</th>
<th>Nucleolar size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Male       Female</td>
<td>Male         Female</td>
<td>Male Female</td>
</tr>
<tr>
<td>1.</td>
<td>Lepisma collaris</td>
<td>Thysanura</td>
<td>24.4 - 25.0 u</td>
<td>8.3 - 9.7 u</td>
<td>1.4 u</td>
</tr>
<tr>
<td>2.</td>
<td>Brachyrhina conteminate</td>
<td>Odonata</td>
<td>30.5 - 32.0 u</td>
<td>11.0 - 12.5 u</td>
<td>2.1 u</td>
</tr>
<tr>
<td>3.</td>
<td>Sphaerodema rusticum</td>
<td>Hemiptera</td>
<td>26.3-33.0 u</td>
<td>7.0-8.3 u</td>
<td>2.1 u</td>
</tr>
<tr>
<td>4.</td>
<td>Cyrtocaria siccifolia</td>
<td>- do -</td>
<td>33.3-34.7 u</td>
<td>6.9-8.3 u</td>
<td>2.1 u</td>
</tr>
<tr>
<td>5.</td>
<td>Dyadora similis</td>
<td>- do -</td>
<td>22.0-23.5 u</td>
<td>7.0-8.3 u</td>
<td>2.1 u</td>
</tr>
<tr>
<td>6.</td>
<td>Phthorimaea operculella</td>
<td>Lepidoptera</td>
<td>19.4-20.8 u</td>
<td>6.9 u</td>
<td>1.4 u</td>
</tr>
<tr>
<td>7.</td>
<td>Syntoma ovata</td>
<td>- do -</td>
<td>19.4-20.8 u</td>
<td>6.9-8.3 u</td>
<td>2.0 u</td>
</tr>
<tr>
<td>8.</td>
<td>Halialis sp.</td>
<td>- do -</td>
<td>19.4-20.8 u</td>
<td>5.5-6.9 u</td>
<td>1.39 u</td>
</tr>
<tr>
<td>9.</td>
<td>Docina hearseana</td>
<td>- do -</td>
<td>19.4-20.8 u</td>
<td>5.5-6.9 u</td>
<td>1.4 u</td>
</tr>
<tr>
<td>10.</td>
<td>Rhibes obtusata</td>
<td>- do -</td>
<td>18.0-19.4 u</td>
<td>6.9-8.3 u</td>
<td>2.1 u</td>
</tr>
<tr>
<td>11.</td>
<td>Samiothisa alemonora</td>
<td>- do -</td>
<td>22.0-23.5 u</td>
<td>6.9-8.3 u</td>
<td>2.77 u</td>
</tr>
<tr>
<td>12.</td>
<td>Grammodes stolida</td>
<td>- do -</td>
<td>22.0-24.0 u</td>
<td>8.3 u</td>
<td>2.07 u</td>
</tr>
<tr>
<td>13.</td>
<td>Epinina genicalliae</td>
<td>- do -</td>
<td>17.0-19.4 u</td>
<td>5.5 u</td>
<td>2.1 u</td>
</tr>
<tr>
<td>14.</td>
<td>Thalassodes sp.</td>
<td>- do -</td>
<td>18.0-19.4 u</td>
<td>5.5-6.9 u</td>
<td>1.04 u</td>
</tr>
<tr>
<td>15.</td>
<td>Papilio demolius</td>
<td>- do -</td>
<td>24.4-25.0 u</td>
<td>6.9 u</td>
<td>2.07 u</td>
</tr>
<tr>
<td>16.</td>
<td>Empisera core</td>
<td>- do -</td>
<td>24.4-25.0 u</td>
<td>5.5-6.9 u</td>
<td>2.07 u</td>
</tr>
<tr>
<td>17.</td>
<td>Delias aetheria</td>
<td>- do -</td>
<td>19.4-20.8 u</td>
<td>5.5-6.9 u</td>
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<td>Drosophila sp.</td>
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<td>(a) Maggot</td>
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<td>Mosquito larva</td>
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