

Short Communication

Pak. j. sci. ind. res., vol. 34, no. 10, October 1991

The Bisexual form of a South Indian Lac Insect

S. MAHDIHASSAN

SD-34, Block A, N. Nazimabad, Karachi-Pakistan

(Received January 21, 1991)

So far only two ways are known by which insects reproduce themselves. One would be the most common method when a female insect is fertilized by its male. A second would be the method found among aphids under some conditions when a female becomes parthenogenic and the male is not required. Then there is a third method not mentioned in the literature when the larva of a winged male lac-insect becomes bisexual and gives rise to a generation of larvae like that of normal female. Since literature is silent in dealing with a bisexual lac insect, it is proposed to discuss it here.

In South India there are two species of lac-insect. One, named *Kerria mysorensis*, is cultivated on its host-plant, *Shorea talura*. Another, named by me *Kerria communis*, is a wild species of lac insects never cultivated anywhere. It grows mostly on *Ficus mysorensis* in Bangalore. It has two life-cycles per year. One covers the humid part of the year, from June to Oct. of 5 months including the monsoon season. The other life cycle consists of 7 months of relatively dry period from Nov. to May. Then about the end of Oct., some *Ficus mysorensis* trees would be found bearing chunks of lac encrustation usually 2 inches long. Then from such source the larvae that swarm would, one and all, become winged males. The question now arises as to how the species continue, to exist when at the end of one life-cycle there are only larvae of winged males. Transported by flies visiting the chunks of lac at the time of larvae swarming as single insects they become bisexual and then function like any fertilized female insect. The normal cell of full grown female lac insect is spherical and smooth surfaced like some medicinal pill. The full grown cell of a bisexual insect is hexagonal in outline and its dorsal surface is decorated with filaments of hard wax. It then easily distinguishes itself and has even been mistaken for a different species. Such a cell seen from above is illustrated here as Fig. 1. There are six patches of hard wax filaments. The outline of the cell is clearly hexagonal. The wax filaments that arise from the six patches seen in Fig. 1, are directed upwards as also downwards. This is seen when the cell is observed from one side. Figure 2. illustrates a cell of a bisexual lac insect seen

from one side. Two patches show wax filaments growing towards the dorsal as also towards the ventral side one to its importance. Figure 3 is added showing a single patch which clearly reveals filaments of hard wax growing in two opposite directions.

A single cell of a normal female lac insect would be spherical in form. Around its equatorial region there would be six patches of pores secreting filaments of hard wax, all directed upwards. These wax secreting pores of a normal female and of a bisexual insect form different patches. They are illustrated in Fig. 4, belonging to a normal female and in Fig. 5 to that of a bisexual insect. These photographs are taken with a low power microscope.

Trying to go to earlier stages of the bisexual insect, as seen in Fig. 1. There is Fig. 6 which shows a hexagonal circumference, Then from six regions patches of wax filaments are shown comparable with those seen in Fig. 1. With further growth, a cell as seen in Fig. 6, would appear now as depicted in Fig. 7. Since the wax filaments of bisexual insect grow upwards and downwards with further growth such patches of wax filaments appear thinner in Fig. 7 than what is the case in the younger cell (Fig. 6). It was thought essential to compare the secretion of wax filaments in a bisexual insect and a normal female cell. Figure 8 shows a cell of a normal female before it has moulted for the last time and become an adult. Its circumference shows three pairs of projections on each side. It reveals lac secretion within which lie patches of hard wax filaments. These are seen in Fig. 9 being the macrophotograph taken under a polarizing microscope. Thus selectively depicts wax filaments through covered by lac as seen in Fig. 8. Figure 10 clearly shows a young adult normal female secreting wax filaments as three pairs of patches on each side. Here the filaments of wax grow only in one direction and are therefore, thicker while those of a bisexual insect grow in two opposite directions and are thinner as is obvious in Figs. 6 and 7.

Summary. Among lac insects *Kerria communis* is a wild species. At the end of one lifecycle it is seen as a small chunk of lac encrustation. From it arise larvae which one and all become winged males. The species exists due to the larvae of winged male becoming bisexual. This method of reproduction is not known with other life forms. Due to its importance the adult bisexual insect has been studied offering illustrations characterizing the bisexual form.

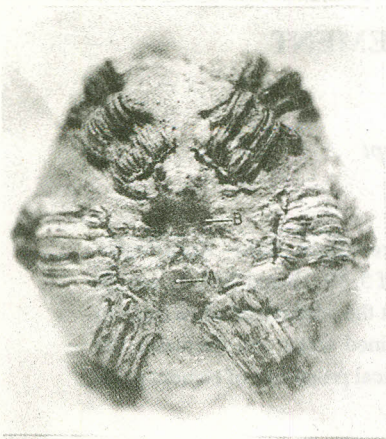


Fig. 1.

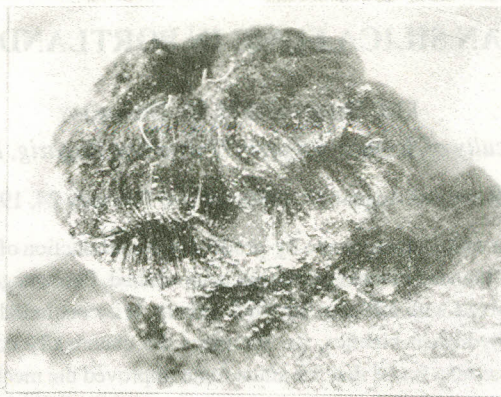


Fig. 2.



Fig. 3.

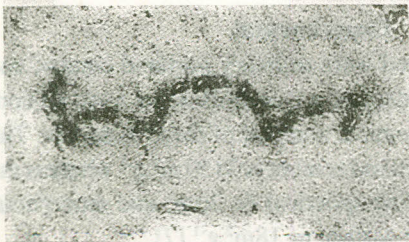


Fig. 4.

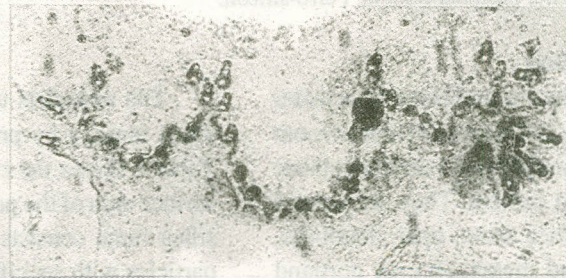


Fig. 5.

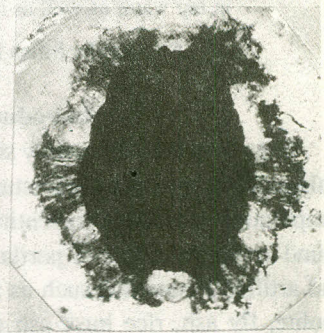


Fig. 6.

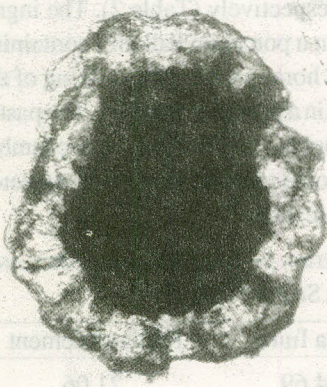


Fig. 7.

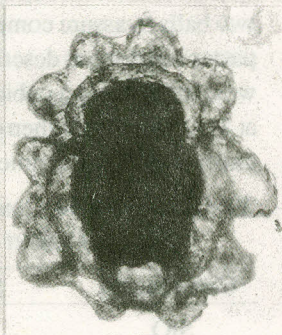


Fig. 8.



Fig. 9.

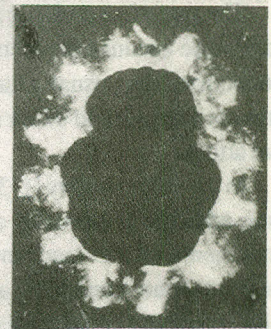


Fig. 10.

- Fig. 1. A hexagonal shaped cell of bisexual lac insect of *kerria communis*. Filaments of hard wax arise from six patches around the equatorial region of insect's body.
- Fig. 2. A bisexual lac cell seen from one side showing in two patches wax filaments arise upwards and downwards.
- Fig. 3. Single patch where filaments of hard wax arise upwards and downwards.
- Fig. 4. Patch of wax pores of a normal female insect.
- Fig. 5. Patch of pores from where wax filaments arise upwards and downwards in a bisexual insect.
- Fig. 6. A younger stage of bisexual insect. The circumference is hexagonal, not round. From six places wax filaments arise upwards and downwards.
- Fig. 7. A more advanced stage than that seen in Fig. 6 with growth the wax filaments have been separated among one another due to their growth upwards and downwards.
- Fig. 8. Younger stage of normal female showing 3 pairs resinous projections on each side. they cover wax filaments.
- Fig. 9. A cell similar to Fig. 8 seen under a polarizing microscope revealing hard wax filaments, three pairs of such complex on either side.
- Fig. 10. A young adult female showing secretion of hard wax filaments as three pairs of such complex on either side revealed by polarizing microscope. Figs 8 to 9 belong to normal cells.