

one or both of these regions might be worth attempting."

Faure (1943a) had shown earlier the occurrence of comparatively weakly developed phases in the lesser army worm *Laphygma exigna* (Hubn.). He has also shown (1943b) that the lawn caterpillar, *Spodoptera abyssinia* Guen. exhibits what is probably an incipient development of phases.

This note has been written with the purpose of bringing Faure's discovery to the notice of Indian entomologists. Phase studies in India should be conducted simultaneously on *L. exempta* and *S. mauritia*. Ayyar (1940, p. 152) states that in the latter the larvæ, when full grown, are dark to pale green, though there is a good deal of variation in colour. This may possibly be due, in part, to phase differences. The life-history of *L. exempta* in S. Africa has been given by Hattingh (1941).

Zoological Survey of
India, Kaiser Castle,
Benares Cantonment,
April 11, 1944.

M. L. ROONWAL.

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MICROBRACON BREVICORNIS, W. IN THE BIOLOGICAL CONTROL OF THE LAB-LAB POD-BORER

Microbracon brevicornis W. (Braconidæ), the ectophagous larval parasite of *Corcyra cephalonica* St., the common moth-pest of stored rice, jowar and flour, has recently been successfully tested in the laboratory and out in the field, against *Adisura atkinsoni*, the common pod-borer caterpillar of Lab-lab. In most of the several cultures set up in the laboratory with particular instars of laboratory-bred pod-borers and treated with freshly emerged individuals of *Microbracon brevicornis* W., the host was readily stung and eggs were deposited by the females; the grubs hatching out from the eggs fed on the caterpillar-hosts and pupated in due course and adult parasites subsequently emerged out. Not only naked and free host caterpillars but also others inside Lab-lab pods in the different cultures were freely parasitised, the female parasites even penetrating easily, through punctures, inside the pods.

Similar observations were made, also, in the case of cloth cages enclosing infested pod-bearing branches of Lab-lab, and others fixed in the soil enclosing whole bushes into which suitable numbers of parasites were introduced.

Bulk releases of *Microbracon brevicornis* W., in selected plots (with proper controls) of borer-infested Lab-lab, in the field were also made at the Hebbal Farm. Definite numbers

of pods picked out at random, at definite intervals in the treated and control plots, were examined in the laboratory and clear and abundant signs of parasitisation were found; other lots of pods picked in the field were kept by, from which adult parasites were, in due course, recovered in fair numbers.

The natural field parasites, namely, *Microbracon hebetor*, of the Lab-lab pod-borer larvæ was, of course, also recovered from the pods picked out from the plots. It is clearly evident that both the natural parasite of the pod-borer larvæ and the introduced or released parasite, *Microbracon brevicornis* W., select out the same hosts separately in the same plot for parasitisation.

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March 12, 1944.

B. KRISHNAMURTI.
M. APPANNA.

CLASSIFICATION OF MANGOES

It is estimated that there are now over 500 known and named varieties of mangoes in India. This number, however, is not based on a scientific system of classification, because it has been usual to classify them on the shape and other characters of the fruit. An attempt is now made to determine whether morphological characters such as tree habit, branching and foliage would be helpful in evolving a satisfactory classification.

The mango wealth of India may be considered under two groups: (a) Seedling trees, and (b) grafted trees. In spite of their number and utility, the latter are merely horticultural varieties, having their origin in chance seedling trees, the genetic purity of which is not established. It must be recognised that as a result of grafting, features like low branching and tree vigor are likely to be influenced by the root-stock and hence a full and natural description of any variety may only be obtained from the original seedling tree. In view of this, only the naturally growing seedling trees ought to be considered as a basis of classification.

In a study of 25 grafted mango varieties and 107 seedling trees grown in the Baroda State, it is observed that:—

(1) The branching is close and erect, semi-open or open, depending upon the angle at which the main branches are held in relation to the main trunk.

(2) The foliage is sparse, medium dense or dense; and light green, green or dark green in colour.

(3) The sizes and shapes of leaves vary widely. Leaves borne at the ends of shoots have a broader base than those at the lower nodes. Waviness of the margin, folding of the sides of the lamina, texture and aroma are some other factors which vary considerably. The anthocyanin displayed by young immature leaves is an interesting character. Scaly leaves of opening buds and those towards the stem apices are generally light green in colour, irrespective of the shade they exhibit as they mature. The light green gradually changes into the characteristic green of fully grown leaves through various intermediate shades.

The intensity of and the changes in the shades observed at various stages of growth from the scaly leaves of opening buds to the fully mature leaves are characteristic of individual trees as also of the grafted varieties.

(4) The size of the inflorescence and the density of flowers also vary.

This study appears to indicate that morphological characters may serve as criteria in building up a system of classification of the mangoes.

Baroda,
May 22, 1944.

S. S. BHAT.

THE MASS-BREEDING OF THE BRACONID, *MICROBRACON HEBETOR* SAY, IN INDIA

KRISHNAMURTI AND SESHAGIRI RAO,¹ in a recent communication to *Current Science*, under the heading "A Preliminary Note on the Breeding of the Beneficial Ectophagous Larval Parasite (Braconidæ) on a laboratory host", claim to have bred *Microbracon hebetor* in some numbers on a laboratory host other than its natural host, for the first time in India.

M. hebetor was discovered in Namkum (Bihar) during 1934 and since then it has been bred in large numbers on several laboratory hosts, for utilisation as introduced parasite against the lac predators, *Holococera pulverea* and *Eublemma amabilis*. The life-history and habits of the parasite have been worked out in some detail and a method has been developed to breed it in large numbers in the laboratory.² This braconid has been reared on several alternative hosts.³ The following table gives a summary of breeding of *M. hebetor* during 1942-43 on some laboratory hosts, which have been found most suitable to breed it.

Name of host larva	Average percentage parasitisation	Number of adults bred per host larva
<i>Holococera pulverea</i>	21.9	1.01
<i>Ephestia cautella</i>	40.5	1.7
<i>Platyedra gossypiella</i>	40.10	2.4
<i>Corcyra cephalonica</i>	26.09	0.93

M. hebetor is an extremely polyphagous species and recorded from different parts of the world. In India, its natural host differs from place to place; its natural host in Chotanagpur (Bihar) appears to be *Ephestia cautella*, a destructive borer pest of flowers and seeds of Mohua (*Bassia latifolia* Roxb.), in Delhi it is found parasitising the caterpillars of *Antegastra*

cataunalis Dup., and *Laphygma* sp., and in S. India the larvæ of *Corcyra cephalonica* and *Adisura atkinsoni*.

In the field of mass breeding of larval parasites on hosts other than the natural host it may be stated that we are getting interesting results in breeding *Microbracon greeni* Ashm., the indigenous and specific parasite of *Eublemma amabilis* and they will be published in due course.

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Namkum, Ranchi,
April 6, 1944.

1. Krishnamurthi, B., and Seshagiri Rao, D., *Curr. Sci.*, 1944, 13, No. 3, 81-82. 2. Glover, P. M., and Chatterjee, K. C., *Proc. Ind. Acad. Sci.*, 1936, 3, No. 3, 195-211. 3. *Annual Reports of the Indian Lac Research Institute, Namkum, 1935-1943.*

WHILE thanking Messrs. P. S. Negi, T. V. Venkatraman and K. C. Chatterjee, for drawing our attention to their work on *Microbracon hebetor*, the results of which, published in the *Annual Reports of the Indian Lac Research Institute, Namkum*, were not accessible to us, we wish to point out, that the results obtained by us, here, independently, have special reference to certain olfactory preferences of the parasite, in an artificially prepared medium having (the laboratory Host) *Corcyra cephalonica* in it. This host is not an alternative normal host of the parasite at all, in any sense, in Mysore.

In the particular kind of medium in which this laboratory host was offered in three lots to the parasite, the following percentages of parasitisation have been obtained.

Lot No.	P.C. of parasitisation	No of adults bred per host
1	66.6	5.5
2	8.3	3.0
3	20.0	4.0
Average ..	25.0	4.5

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