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Material: Holotype female reared on 28. 5. 1954. Five paratype females bred on the same date. Allotype male and eight paratype males bred on 25. 4. 1954. Endoparasite of *Lecanium coryli* L. on *Fagus silvatica* L. at Silwood Park, Berks, England.

Summary

There are described as new *Aphidencyrtus qadrii* and *Blastothrix coryli*, encyrtid parasites of *Homoptera*. Revised keys to species of *Aphidencyrtus* and *Blastothrix* females are *included*.

Zusammenfassung

Zwei neue in Homopteren parasitierende Encyrtiden werden beschrieben: *Aphidencyrtus qadrii* und *Blastothrix coryli*. Bestimmungsschlüssel für die Weibchen der Gattungen *Aphidencyrtus* und *Blastothrix* werden beigegeben.

Резюме

Описываются два новые *Encyrtidae*, паразитирующие в *Homoptera*: *Aphidencyrtus qadrii* и *Blastothrix coryli*. Прилагаются ключи-олределители для самок из родов *Aphidencyrtus* и *Blastotrix*.

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Studies on Allophanurus indicus n. sp., an Egg Parasite of Bagrada cruciferarum Kirkaldy

(*Hymenoptera*: *Scelionidae*)

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(With 2 plates and 1 figure)

Bagrada cruciferarum Kirkaldy is a very serious pest of cruciferous crops in India. Samuel (1942) recorded 2 species of Scelionids, *Liophanurus samueli* Mani and *Tiphodytes* sp., parasitising the eggs of this pest. Recently Narayanan et al. (1959) recorded *Hadrophanurus* sp. on this pest at Karnal, The Punjab. During the months of May and

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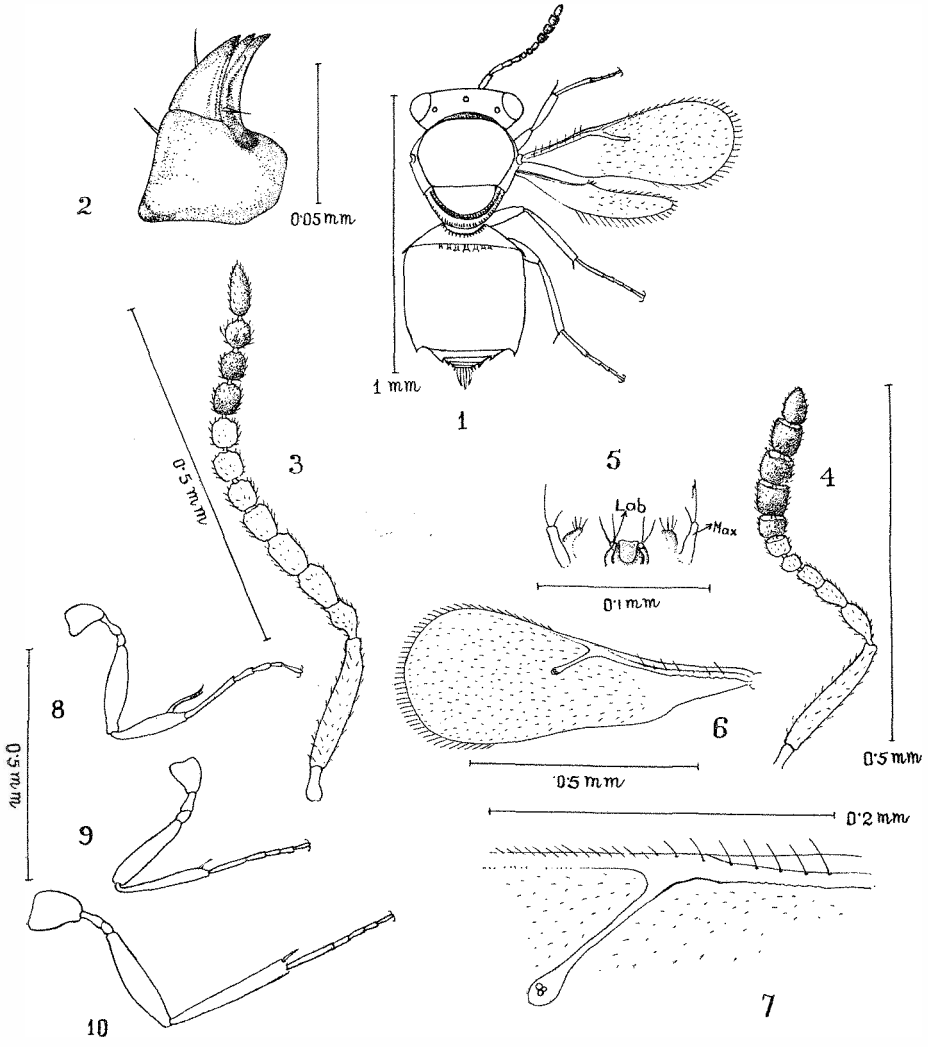

Allophanurus indicus n. sp.

Fig. 1. Adult female. — Fig. 2. Mandible, female. — Fig. 3. Antenna, male. — Fig. 4. Antenna, female. — Fig. 5. Labial and maxillary palpi, female. — Fig. 6. Forewing, female. — Fig. 7. Wing, female, part showing submarginal, marginal, stigmal and post marginal veins. — Fig. 8, 9, & 10. Fore, mid and hind legs, female

B. R. Subba & J. Chacko, *Allophanurus indicus* n. sp.

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June, 1959, the present authors abserved *Allophanurus indicus* n. sp. attacking the eggs of *B. cruciferarum* at Delhi.

In this paper *Allophanurus indicus* n. sp., its biology, some aspects of the morphology of the immature stages, the fecundity, longevity, and sex ratio are described in detail.

Allophanurus indicus n. sp.

♂♀ Brownish black. Legs yellowish, coxae and last tarsal segments brownish. Scape of female yellowish, 2nd to 6th antennal segments yellowish brown, 7th to 11th brownish. Scape of male yellowish, 2nd to 8th yellowish brown, 9th to 11th brownish. Wings transparent, veins and hairs of wing yellowish brown.

Female (Plate 14, fig. 2): Head slightly broader than thorax, sparsely hairy and finely reticulate. Antenna shorter than body (Plate 14, fig. 4), 11-segmented, hairy and with a pointed club; scape long and slender; pedicel proximally narrow and thickening distally; 3rd segment longer than 4th, 5th and 6th more or less spherical; 7th larger than 6th, but smaller than 8th; 8th to 10th almost as long as broad and 11th conical at the tip. Frons with a shallow groove and a small keel just above the base of the antennae. Ocelli; distance between the median and lateral ocellus slightly more than half the distance between the lateral ocelli; lateral ocelli very close to the eyes. Labial and maxillary palpi (Plate 14, fig. 5) 1-jointed; mandible 3-dentate.

Thorax broadly rounded anteriorly, markedly narrowed posteriorily. Pronotum not visible from above; parapsidal furrows absent; scutum finely hairy and reticulate; scutellum sparsely hairy; metanotum narrow; lines of union of scutellum and metanotum, metanotum and propodaeum, propleuron and mesopleuron, mesopleuron and metapleuron, and metapleuron and pleuron of propodeum pitted. Post-marginal vein very faint and without any definite termination; marginal vein slightly less than half stigmal vein (Plate 14, fig. 7). Legs hairy. Fore tibia shorter than femur and with a well developed curved bifid apical spur; 1st tarsal segment longest, almost as long as tibia and as long as the other 4 tarsal segments. Mid tibia almost as long as the femur and with an apical spur; 1st tarsal segment longest, almost half the length of tibia. Hind tibia slightly longer than femur and with an apical spur; 1st tarsal segment longest, longer than half the length of tibia (Plate 14, fig. 8—10).

Abdomen longer than broad; 1st segment narrow and with striations at the anterior margin. Tergum of 2nd segment smooth and shining, very large and covering more than ¾th the dorsal surface of the abdomen and with a few pits in the middle of the anterior margin. The rest of the 4 visible abdominal segments very narrow.

Male: Antenna moniliform (Plate 14, fig. 3), 12-segmented and without a club; 3rd and 4th segments more or less equal in length, 5th shorter, 6th to 11th still shorter and more or less spherical; 12th long and conical

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at the tip. Mid tibia slightly longer than femur. Hind tibia almost as long as femur; 1st tarsal segment shorter than half the length of tibia.

Length ♀ — 0.95 mm
♂ — 0.89 mm

Allophanurus indicus differs from the two other species of *Allophanurus* described so far in the following respects: It differs from *A. vibius* (F. Walker) in having the thorax broadly rounded anteriorily and markedly narrowed posteriorily and in having transparent wings and yellowish tarsal segments (except the last tarsal segment which is brownish); *A. vibius* has long egg-shaped thorax and brown wings and tarsi.

The male of *A. indicus* differs from *A. arminon* (F. Walker) (only male has been described) in having only 6th to 11th antennal segments spherical, in having a faint post marginal vein without any definite termination and in having yellowish trochanters; in *A. arminon* 3rd to 8th antennal segments are spherical, post marginal vein reaches almost distal end of wing and trochanters are brown.

Described from 2 ♀♀ and 2 ♂♂
Holotype — on card mount ♀
Allotype — on card mount ♂
Paratype — 2, dissected and mounted on microslides.
All deposited in National Pusa Collection
Type Locality — New Delhi
Host — Eggs of *Bagrada cruciferarum* Kirkaldy
Collected by M. J. Chacko, April 1959.

Technique of Experiment

Only eggs laid in the laboratory by *Bagrada cruciferarum* were used for experimental purposes. Fresh host eggs were collected and pasted on rectangular strips of cards and exposed to parasites in specimen tubes for oviposition. The parasitised eggs were dissected under a binocular microscope and studies on the immature stages made.

For studies on the fecundity, longevity, and sex ratio, fresh host eggs were exposed each day to a pair of parasites in a specimen tube. Six replications were made. These experiments were conducted at a temperature varying from a maximum of 86° F. and a minimum of 75° F., and at a relative humidity of 75 per cent.

Host Selection and Oviposition Behaviour

The females of *Allophanurus indicus* exhibit an acute competition among themselves for access to the host eggs; they fight amongst themselves and even drive away others which are in the act of oviposition. 24 hour old eggs are also attacked by the parasites, and successful development and emergence of the latter take place.

Prior to oviposition the host eggs are examined by the parasites with their antennae for periods varying from 5 to 10 seconds; after examination,

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the parasites lay the eggs. It takes about 1 to 3 minutes to lay an egg. Soon after depositing the egg, the parasite makes scratches with the aid of the ovipositor on the surface of the host eggs so as to distinguish the attacked eggs from the healthy ones. The period for scratching one host egg varies from 5 to 10 seconds. However, even host eggs thus marked are observed to be attacked more than once. But in no case more than one parasite completes its development and emerges as adult from a single host egg.

The time taken for development and emergence under laboratory conditions was seven days.

Immature Stages

Egg (Plate 15, fig. 1—3). The egg is transluscent, more or less oval and stalked. It is 0.29 mm long and 0.14 mm wide, immediately after oviposition. The pedicel alone measures 0.09 mm in length. After about 6 hours of incubation the pedicel disappears.

First Instar Larve (Plate 15, figs. 4, 5 & 6). The incubation period of the egg varies from 10 to 12 hours. The first instar larva is typically 'teleaform'. Its body is unsegmented, but is divided by a sharp constriction into a cephalothoracic region and an abdomen. The mandibles are well developed and there is a small process on the ventral side of the thoracic region. The cephalothoracic and abdominal regions are separated by a band of setae. The abdomen is globular and ends in two caudo-ventral horns, one long and reaching the mandibles, and the other shorter. Both these horns are directed forwards and upwards.

As the larva develops, a blind sac-like yellow alimentary tract appears within the abdomen and the longer caudo-ventral horn gets much reduced in length.

This stage lasts for about 14 to 15 hours. The maximum length of the caudoventral horn observed was 0.41 mm and breadth 0.24 mm.

Second Instar Larva (Plate 15, figs. 7). This instar is irregularly ovoid. The setae are still present, but not regularly arranged. The caudoventral horns are absent altogether. There is no indication of body segments or tracheal system or spiracles. Peristaltic movements of the alimentary tract can be observed. The mandibles are present, but are much reduced.

The duration of this stage is about 12 hours. The maximum length observed was 0.84 mm and breadth 0.68 mm.

Third Instar Larva (Plate 15, figs. 8—10). At about 37 hours of development, tracheae, longitudinal trunks and non-functional spiracles make their appearance. Segmentation of the body also begins to take place. Very soon the body becomes more or less globular and very profuse branchings of the tracheae are observed within the body. As the larva develops, the longitudinal and lateral trunks become well developed.

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There are 13 body segments, and 9 pairs of spiracles, two thoracic and 7 abdominal. The lateral longitudinal trunks are united anteriorly as well as posteriorly, thus forming a complete ring. Though the lateral longitudinal trunks are connected together by a well developed anterior transverse commissure, a posterior transverse commissure is not present. The lateral longitudinal trunks themselves join in the posterior region to complete the ring. The anterior spiracular trunks are longer than the posterior ones.

The mandibles are still present, but are much smaller.

This stage lasts for about 32 hours. The maximum length and breadth of this stage were 0.86 mm and 0.79 mm respectively.

Pupal Stage. The larva devours all the contents of the host egg and pupates within the egg shell. The pupa is black, and this stage lasts for 3 to 4 days. The adult parasite cuts a hole on the egg shell and emerges.

Length of Life Cycle

Incubation period	10—12 hours
First Instar Larva	14—15 hours
Second Instar Larva	12 hours
Third Instar Larva	32 hours
Pupal Stage	3—4 days

Studies on Fecundity, Longevity and Sex Ratio

These records are based on observations made in the laboratory.

Fecundity. The fecundity of *Allophanurus indicus* varied from 140 to 184, the average being 158 (Table 1). The maximum number of eggs were laid during the first 24 hours of exposure of the host eggs. As many as 36 eggs were laid during this period. No eggs were laid during the last few days of the life of the parasite.

Table 1. Fecundity and viability of *A. indicus*

Replication	Fecundity	Average fecundity[1]	Number of parasites emerged	% age of emergence	Average %age of emergence[2]
1	184		158	85.88	
2	140		110	78.57	
3	151	158	130	86.08	82.4
4	143		115	80.42	
5	172		139	80.81	
6[3])	81		65	80.24	

[1]) Fecundity was estimated by counting the number of host eggs that turned black after exposure to the parasite.

[2]) Average of first five replications.

[3]) Accidentally killed on the 11th day.

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Emergence. It is clear from Table 1 that all eggs that were laid did not complete their development and emerge as imagines. The percentage of emergence varied from 78.85 to 86.10, the average being 82.4. The rate of reproduction varied from 5.72 to 8.76, the average being 7.1 (Table 1).

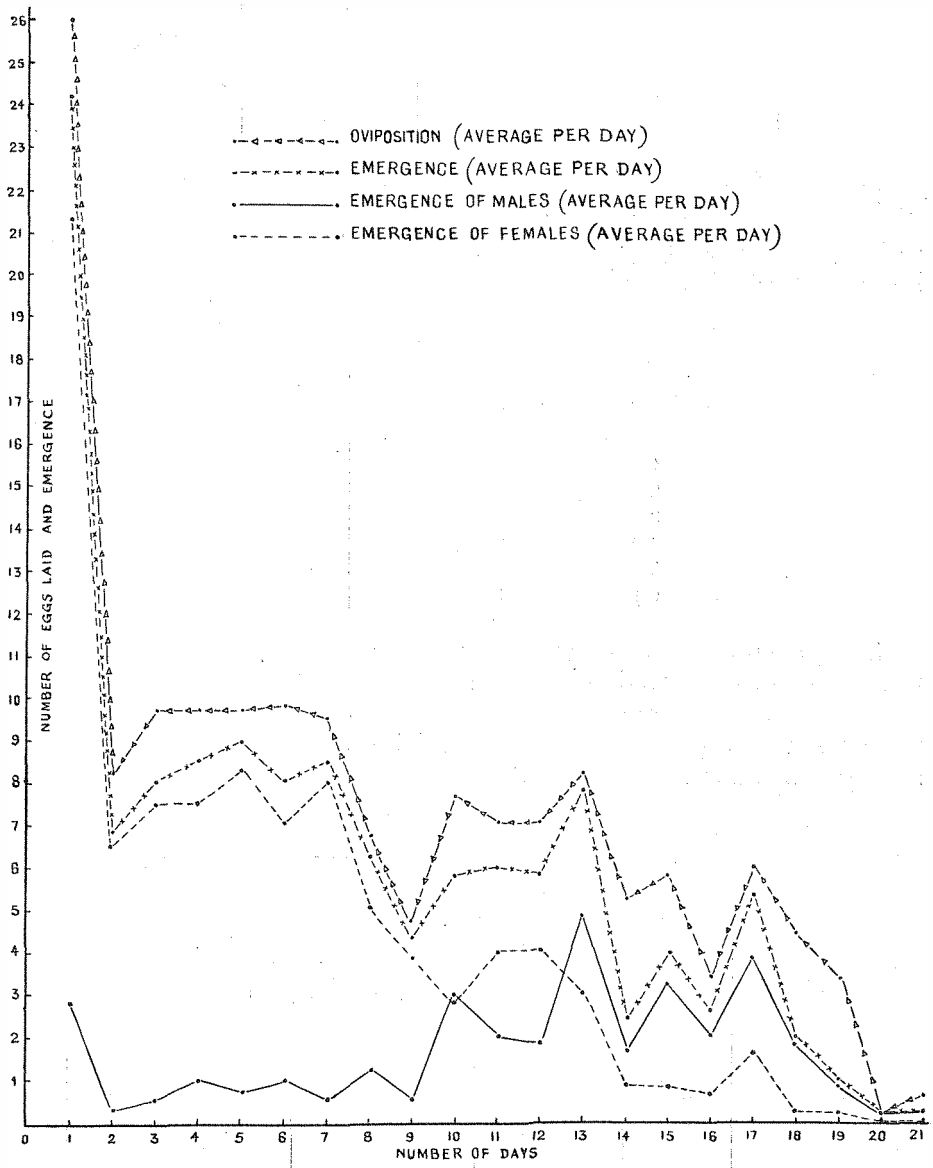

Fig. 1. Oviposition and emergence of *Allophanurus indicus* n. sp.

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Table 2. Rate of reproduction of *A. indicus*

Replication	Fecundity	No. of egg laying days	Rate of reproduction	Average rate of reproduction[2]
1	184	21	8.76	
2	140	19	7.37	
3	151	25	6.04	7.1
4	143	25	5.72	
5	172	23	7.48	
6[1])	81	10	8.10	

Longevity. When fed on 10% sugar solution, the parasites lived for periods varying from 30 to 38 days under laboratory conditions. The average longevity was 33.4 days (Table 3). The longevity of the male parasites varied from 10 to 15 days.

Table 3.

Replication	Longevity of female parasites	Average longevity[2]
1	30 days	
2	34 days	
3	30 days	33.4 days
4	35 days	
5	38 days	
6[1])	30 days	

Sex Ratio. It was observed that during the first few days of oviposition, very few males were produced (see Fig. 1 and Tables 4 & 5). However, the number of males predominated from the 13th day onwards. Only male parasites were produced from the eggs laid during the last few days. The sex ratio was observed to be 1:3.

Very little information is available on the biology and morphology of the immature stages, the longevity, fecundity and sex ratio of the *Scelionidae*.

Table 4

Replication	No. of parasites emerged	No. of males emerged	Total males	%age of males	Average %age	No. of females emerged	Total females	%age of females	Average %age	Sex Ratio
1	158	48		30.78		110		69.61		
2	110	23		20.90		87		79.09		
3	130	57	174	43.85	23.4	73	543	56.15	76.6	1:3
4	115	21		18.26		94		81.74		
5	139	14		10.07		125		89.93		
6	65	11		16.92		54		83.08		

[1]) Accidentally killed on the 11th day.

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Table 5

No. of egg laying days	No. of eggs laid per day (average)	Average emergence per day	Emergence of males, average per day	Emergence of females, average per day
1	26.2	24.1	2.8	21.3
2	8.2	6.8	0.3	6.5
3	9.7	8.0	0.5	7.5
4	9.7	8.5	1.0	7.5
5	9,7	9.0	0.7	8.3
6	9.8	8.9	1.0	7.0
7	9.5	8.5	0.5	8.0
8	6.7	6.2	1.2	5.0
9	4.7	4.3	0.5	3.8
10	7.7	5.8	3.0	2.8
11	7.0*	6.0*	2.0*	4.0*
12	7.0	5.8	1.8	4.0
13	8.2	7.8	4.8	3.0
14	5.2	2.4	1.6	0.8
15	5.8	4.0	3.2	0.8
16	3.4	2.6	2.0	0.6
17	6.0	5.4	3.8	1.6
18	4.4	2.0	1.8	0.2
19	3.4	1.0	0.8	0.2
20	0.2	0.2	0.2	0.0
21	0.6	0.2	0.2	0.0

Although 3 parasites laid eggs for more than 21 days, only the data for 21 days are given above

Discussion

The present investigation was taken up with a view to study these aspects in the case of *Allophanurus indicus*.

Host selection. *Allophanurus indicus* does not show any particular preference for freshly laid host eggs for oviposition. Host eggs, which are 24 hours old, are readily, accepted for parasitisation, and successful development of the parasites takes place in them. Costa Lima (1928) records that *Telenomus fariai* Costa Lima develops successfully in the eggs of *Triatoma*, whose embryos are well advanced at the time of oviposition. However, certain scelionids show a preference for freshly laid eggs for oviposition. Narayanan et al. (1959) have observed that *Aholcus euproctiscidis* Mani prefers freshly laid eggs of *Euproctis lunata* Walker. Parman (1928) states that *Phanurus emersoni* Girault does not oviposit in eggs of *Tabanus hyalinipennis* Hine, which are more than 6 hours old. Thus it is clear that while some scelionids deposit only in freshly laid host eggs, others do not show any such preference.

Superparasitism. The members of the family *Scelionidae* exhibit a considerable degree of selectivity. *Allophanurus indicus* scrapes the surface of the host eggs with the ovipositor soon after depositing its egg so as to

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discriminate between parasitised and healthy host eggs. The same phenomenon has been observed by MORRILL (1907) in the case of *Telenomus ashmeadi* MORRILL, and by COSTA LIMA (1928) in the case of *T. fariai*. However, when only a limited number of host eggs are available for oviposition, *A. indicus* is observed to deposit in host eggs that are already parasitised and which have the markings made on their surface by the ovipositor; here the ability to maintain the restraint breaks down to a certain extent. However, in no case more than one parasite completes its development and emerges from a single host egg.

Immature Stages. The first instar larva of *A. indicus* resembles that of *Aholcus euproctiscids* in having no antennal processes above the base of the mandibles, but differs from it in not having equally developed caudo-ventral horns. The antennal processes have been observed in *Scelio pembertoni* TIMBERLAKE by PEMBERTON (1933), and in *S. fulgidus* CRAWFORD by NOBLE (1935). Only one caudo-ventral horn is mentioned in all scelionids whose life history has been worked out, except in the case of *Aholcus euproctiscidis* by NARAYANAN et al. (1959); in some species of scelionids one or two supplementary lobes are present at the base of the horn; but in *Aholcus euproctiscidis* two equally well developed horns are present. In *Allophanurus indicus*, although two caudo-ventral horns are present, one is short and the other longer, almost as long as the body during the early stages. However, as the larva grows, the longer horn becomes much reduced in length.

The second instar larva in scelionids has been observed only by a few workers. A definite second instar larva is present in *A. indicus*. As in the second instar of *Aholcus euproctiscidis*, there is no indication of body segmentation or tracheal system or spiracles in the second instar of *Allophanurus indicus*. There is no reduction in the size of the second instar larva, as compared to the first instar. A reduction in the size of the second instar has been observed by NARAYANAN et al. (1959) in the case of *Aholcus euproctiscidis*.

In the third instar larva well developed tracheal system and spiracles are present. The body is segmented. 9 pairs of spiracles are present in *A. indicus*. JONES (1937) records 9 pairs of spiracles in *Telenomus ulyetti* NIXON. 8 pairs of spiracles were observed by NARAYANAN et al. (1959) in *Aholcus euproctiscidis*. KAMAL (1938) mentions that in *Microphanurus basalis* WOLLASTON though 9 pairs of spiracles are present, only the two pairs of thoracic spiracles are functional and the rest are minute and closed. However, in *A. indicus* all the 9 pairs of spiracles are well developed and functional.

Fecundity. The reproductive capacity of the Scelionidae is relatively low. In *A. indicus* the average fecundity observed was 158, under laboratory conditions. MCCOLLOCH and YUASA (1915) state that in *Eumicrosoma benefica* GAHAM, the maximum number of eggs laid by a single female was 54 and

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that the average number of eggs found in the ovaries was 22. PEMBERTON (1933) observes that the maximum fecundity of *Scelio serdangensis* TIMBERLAKE was 54 and the minimum 10. In case of *Scelio fulgidus* NOBLE, NOBLE (1935) observes an average of 233.6 eggs in the ovaries of gravid females. A maximum of 97 eggs, a minimum of 40 and an average of 69 eggs were recorded by NOBLE (1937) in *Microphanurus basalis*. Upto 275 eggs from a single female were observed by VAN VUUREN (1935) in *Phanurus beneficiens* (ZEHNTNER). It is evident from the foregoing account that the fecundity of *A. indicus* is not low compared to thet of other scelionids.

Longevity. In *A. indicus* the maximum longevity observed was 38 days, the minimum 30, and the average 33.3, under laboratory conditions. The longevity of *Scelio serdangensis* TIMBERLAKE does not exceed three weeks in the laboratory when food was given (PEMBERTON, 1933). According to NOBLE (1935), the maximum longevity of *Scelio fulgidus* is 21 days. McCOLLOCH & YUASA (1914) mention that the adult life of *Eumicrosoma benifica* varies from a few hours to 25 days without food. It is clear from the above that *A. indicus* has a longer life than many of the other scelionids.

Sex Ratio. In all species of Scelionidae, for which figures are available, the females outnumber the males. This is the case in *A. indicus* also, where the females predominate the males 3:1. 70 to 75% of *Eumicrosoma benefica* (McCOLLOCH & YUASA, 1914), and 60.22% of *Scelio fulgidus* (NOBLE, 1935) were observed to be females. As many as 10 females to one male were observed in the case of *Phanurus beneficiens* in Java by VAN VUUREN (1935).

A close observation of the daily emergence of *A. indicus* (Table 5) shows that the females outnumbered the males during the first 12 days of emergence of the parasites. The males dominated from the 13th day onwards. It may be pointed out here that in each of the replications, only one male was allowed to remain in company with the female and that the male parasites lived for 10 to 15 days only, while the females continued to live and lay eggs. It is possible that the ovipositing females laid more fertilised eggs during the first 12 days when male parasites were present and the death of the latter resulted in the preponderance of the males from the 13th day onwards, as the females did not have enough sperms for fertilising the eggs after the death of the males. Probably the females of *A. indicus* made more than once. Here is a vista for further research on the problem of sex ratio among the scelionids.

Acknowledgments

We are grateful to Dr. B. P. PAL, Director, and to Dr. E. S. NARAYANAN, Head of the Division of Entomology, I. A. R. I., for extending to us the necessary facilities in connection with this work and also for offering criticisms.

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Summary

1. Laboratory studies were conducted on the biology and morphology of the immature stages, and the longevity, fecundity and sex ratio of *Allophanurus indicus* n. sp., an egg parasite of *Bagrada cruciferarum* KIRKALDY.
2. It was observed that the female parasites fight amongst themselves for access to the host eggs, and even drive away other parasites which are in the act of oviposition.
3. The parasite makes scratches on the surface of the host eggs after parasitisation, by means of the ovipositor, in order to discriminate between healthy and parasitised host eggs.
4. However, when only a few host eggs are available for oviposition, superparasitism occurs. But only one parasite completes development and emerges successfully from a single host egg.
5. The first instar larva is 'teleaform', but differs from that of other scelionids whose life cycle has been worked out, in having 2 caudo-ventral horns, one very long and the other shorter, and in not having antennal processes.
6. A second instar stage definitely intervenes.
7. The third instar larva is segmented and has 9 pairs of well developed spiracles.
8. Under laboratory conditions the fecundity of the parasite varied from 140 to 184, the average being 158. The percentage of emergence varied from 78.57 to 86.08, with an average of 82.4. The average rate of reproduction was 7.1.
9. The longevity of the parasite, when fed on 10% sugar solution, was 30 to 38 days, the average being 33.4 days.
10. The females outnumbered the males 3:1.
11. It is suggested that the preponderence of male parasites from the 13th egg laying day onwards is due to the absence of the the male parasites whose longevity varied from 10 to 15 days.

Zusammenfassung

1. Die Arbeit behandelt Ergebnisse von Laboratoriumsuntersuchungen über Biologie und Morphologie der Jugendstadien, Lebensdauer, Fruchtbarkeit und Geschlechterverhältnis von *Allophanurus indicus* n. sp., einem Eiparasiten von *Bagrada cruciferarum* KIRKALDY.
2. Es wurde beobachtet, daß die Parasitenweibchen um den Platz auf den Wirtseiern untereinander kämpfen, wobei sogar andere Individuen mitten während der Eiablage vertrieben werden können.
3. Die Parasiten kratzen im Anschluß an die Eiablage mit Hilfe des Ovipositors eine Rinne in die Oberfläche des Wirtseies, um zwischen parasitierten und unparasitierten Eiern unterscheiden zu können.
4. Wenn allerdings nur wenige Wirtseier zur Ablage verfügbar sind, tritt Superparasitismus auf. Aber nur ein einziges Parasitenindividuum kommt zur Entwicklung und schlüpft erfolgreich pro Wirtsei.
5. Das erste Larvenstadium ist "teleaform", unterscheidet sich jedoch von dem anderer Scelioniden, deren Entwicklung bisher bekannt wurde, durch 2 caudoventrale Hörner, eines sehr lang, das andere kürzer, und durch das Fehlen von Antennalprocessus.
6. Ein zweites Larvenstadium ist mit Sicherheit anzunehmen.
7. Das dritte Stadium ist segmentiert und hat 9 Paar gut entwickelter Stigmen.
8. Unter Laboratoriumsbedingungen schwankte die Fruchtbarkeit zwischen 140 und 184 (Mittelwert: 158). Die Schlüpfrate variierte zwischen 78.57 und 86.08 (Mittelwert: 82.4). Die durchschnittliche Reproduktionsrate betrug 7.1.
9. Die Lebensdauer der Parasiten lag bei Fütterung mit 10%-iger Zuckerlösung zwischen 30 und 38 Tagen (Mittelwert: 33.4).

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10. Die Weibchen übertrafen die Männchen zahlenmäßig etwa 3:1.
11. In den ersten Tagen schlüpften mehr Weibchen als Männchen. Das Überwiegen der schlüpfenden Männchen vom 13. Tage an ist wahrscheinlich darauf zurückzuführen, daß die Lebensdauer der Männchen durchschnittlich nur 10—15 Tage beträgt, so daß gegen Ende der Ablageperiode mehr unbefruchtete Eier abgelegt werden.

Резюме

1. В работе обсуждаются результаты лабораторных исследований по биологии и морфологии ювенильных стадий, продолжительности жизни, плодовитости и полового соотношения у *Allophanurus indicus* n. sp. паразита яиц *Bagrada cruciferarum* Kirkaldy.

2. Отмечалось, что паразитирующие самки вели между собой борьбу за место на яйцах хозяина, причем во время яйцекладки посторонние особи даже могли быть обращены в бегство.

3. После яйцекладки паразиты при помощи яйцеклада делают желобок на поверхности яйца хозяина, чтобы отличать паразитированных яиц от непаразитированных.

4. В тех случаях, когда имеется недостаток в яйцах хозяина, наступает суперпаразитизм. Однако, лишь один паразитирующий индивид сможет развиваться и вылупиться из каждого яйца.

5. Первая личиночная стадия „teleaform" отличается от стадий прочих *Scelionidae*, развитие которых до сих пор стало известным, двумя каудовентральными рогами, — из которых один очень длинен, другой — короче, — и отсутствием *Antennalprocessus*.

6. С достоверностью можно считаться с существованием второй личиночной стадии.

7. Третья стадия сегментирована и обладает 9 парами хорошо развитых стигматов.

8. В лабораторных условиях плодовитость колебалась между 140—184 (средний показатель: 158). Доля вылупления варьировала между 78.57 и 86.08 (средний показатель: 82.4). Средняя доля репродукции составляла 7.1.

9. Жизнь паразитов продолжалась, при кормлении десятипроцентным сахарным раствором, 30—38 дней (средний показатель 33.4).

10. Численность самок превысила численность самцов в соотношении 3:1.

11. В первые дни число вылупившихся самок было больше числа самцов. Преобладание самцов начиная с 13 дня вероятно об'ясняется тем, что продолжительность жизни у самцов в среднем составляет лишь 10—15 дней, так что к концу яйцекладки откладывается больше неоплодотворенных яиц.

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Vergleichend-morphologische Untersuchungen an den Mundteilen bei Empididen

(*Diptera*)

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(Mit 30 Textfiguren)

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