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15. DORMITORIES OF *CHALYBION BENGALENSE*
DAHLB. (HYMENOPTERA : SPHECIDAE)

Several wasps of both sexes of the common domestic species *Chalybion bengalense* Dahlb. were observed to gather in a small lavatory at Unit 5, Type VIII, No. 2, Bhubaneswar, in the afternoon. This lavatory is in a courtyard and separated from other rooms in the house. In the evening, these wasps settled on the hanging chain of a cistern, where they spent the night. They also settled on this chain during the day if it was cloudy or raining. The chain hangs freely, and is composed of 16 links each about 3.7 cm. long, in the form of a figure of 8, with one loop of the 8 in a plane perpendicular to that of the other, each loop being about 8 mm. broad. At the bottom of the chain is a handle connected to the chain by an S-shaped piece. The top of the chain is connected to the shaft, also by an S-shaped link. The bottom of the handle is 136 cm. above the floor of the lavatory and the top of the chain about 2 m. above the floor and 44 cm. below the ceiling. Observations were begun on 18.x.1963. The date and time of each observation with the number of wasps present and their positions (when noted) is given below. The links are counted from below :

Sunrise and sunset timings for this period were about 05.50 and 17.15 respectively.

From the above observations, it is seen that up to 15 wasps spent the night on this chain, this number gradually decreasing till no wasp was seen on the chain after 5.xi.1963. This species, like some others in this part of India, disappears during the winter. Eggs laid after about September spend the winter as diapausing final instar larvae, some of them completing their metamorphosis in about February, but most of them doing so in about May (Jayakar & Spurway 1964).

The wasps also collected on this chain when the weather was not suitable for their activities outside.

When they came to spend the night in clear weather, however, the earliest a wasp was recorded was 15.34 (on 20.x.1963) and the latest

DATE	TIME	NO. OF WASPS	POSITION
18/x	17.06	about 10	flying around chain
	21.36	15	on chain
19/x	08.51	0	
	09.39	0	
	13.33	0	
	16.34	12	10 on chain, 2 on cistern (1 just arrived)—some activity
			4th, 5th, 6th links
20/x	18.17	15	
	15.07	0	
	15.34	2	1 on cistern, 1 on 8th link
	17.45	7	4th and 5th links
21/x	07.22	1	on cistern
	*12.55	0	
	*12.56	1	on chain
	*12.57	2	on chain
	*12.58	4	on chain
	**12.59	5	on chain
	**13.02	5	4th and 5th links
	**13.35	5	3rd to 6th links
	15.16	6	3rd to 8th links
	17.49	8	3rd to 6th links
	*07.40	3	1 on 7th link, 1 on 11th link, and 1 on pipe below cistern
22/x	**09.19	0	
	**13.20	0	
	17.45	9	3rd to 10th links
	*17.15	0	
	17.47	0	
24/x	09.04	0	
25/x	17.16	1	9th link
27/x	17.43	2	6th and 9th links
	21.53	2	6th and 9th links
	22.05	3	1 on 3rd link, 2 on 5th
29/x	20.37	1	5th link
30/x	06.50	1	5th link
31/x	18.59	1	8th link
	06.50	0	
1/xi	17.27	2	6th and 7th links
	06.40	2	4th and 6th links
2/xi	20.07	2	5th and 8th links
3/xi	16.37	1	5th link
4/xi	19.53	1	5th link
5/xi	08.10	0	
	18.53	2	1 on 5th and 6th links; 1 on 8th link
6/xi	18.08	0	
7/xi	17.51	0	
8/xi	17.46	0	

* indicates cloudy weather.

** indicates rain.

time which the data provide for the arrival of a wasp is 17.16 (on 27.x). The latest a wasp was seen on the chain in the morning on a clear day was 06.50 (on 31.x).

The data for 21.x show the arrival of wasps just as rain was about to start, but more wasps had arrived by the evening so that not all members of the aggregate were able to get back to the roost for the period of rain.

The wasps collected together on a small part of the chain (centred round the 5th and 6th links) rather than distribute themselves over the whole chain. For instance, on 19.x, 15 wasps occupied a part of the chain about 11 cm. long, and on 10.x, 7 wasps were all found on length of chain about 7.5 cm. long. The male of this species is statistically smaller than the female, but there is considerable overlap, so that the numbers of the two sexes present could not be counted separately.

The wasps always clung to the chain in a vertical position, always facing upwards except once, on 2.xi, when one wasp was seen resting facing vertically downwards.

A larger roost of this species was seen on 18 and 19.ii.1964. This roost contained about 40 individuals of both sexes on disused strips of iron hanging from a ceiling in a badly lit but much used room in a house a few kilometres from the last one. However, as this colony was seen at about 15.00 hours on a clear day, it may have been a hibernating colony, even though individuals flew a few centimetres and settled again.

We have also seen solitary sleeping individuals of this species.

Sleeping aggregates of one or several species of solitary aculeate hymenoptera have been described before mainly on trees or shrubs. Where females spend their nights in or near their nests, sleeping aggregates sometimes consist of only males. However, it is known that *Chalybion bengalense* females do not spend the night in the immediate vicinity of their nests.

There are known to be wide variations in the sleeping posture between related species. Rau & Rau (quoted by Wynne-Edwards 1962, p. 309) described two colonies of the related *Chalybion caeruleum* (Johansson and Linnaeus) [now *californicum* (Saussure)] but their colonies were both on the under sides of horizontal surfaces, one of them consisting of about 30 individuals of both sexes. We do not know of other reports of *Chalybion bengalense* dormitories.

Evans & Linsley (1960) have discussed, very briefly, the advantages that may be gained from sleeping in such aggregates, and the stimuli responsible. They suggested that such aggregates may provide protection from predators. But, on the contrary, it seems to us that such aggregation would make them more vulnerable to predators. Lowther (1949, p. 27) and Moore (quoted by Wynne-Edwards 1962, p. 301)

have described bird roosts where predators collected every evening to prey on individuals at the roost and leaving it respectively. However, we do not know of similar observations on wasp roosts. Linsley (quoted by Evans & Linsley 1960) had previously described a sleeping aggregate composed of both host and parasitic species.

Wynne-Edwards's (1962) explanation seems to us more plausible. He suggests that such roosts serve an epideictic purpose, i.e. they provide for the members of a species occupying a certain area an 'estimate' of the population density and thus help in their dispersion. However, mixed roosts of more than one species would not serve this purpose. It may be significant to quote here from Evans & Linsley (1960): 'Such aggregations [of hymenoptera] may be dense and ball-like, or they may be loose, with the individuals sharing the same sleeping site but not maintaining physical contact. The dense aggregations usually consist of a single species. By contrast, loose aggregations may be of diverse composition, involving bees and wasps of a number of different families.' The members of the roosts described by us tended to minimise the space that they occupied. Wynne-Edwards (1962) refers to many other similar observations including the Raus's observations on another solitary wasp, *Elis quinquenotata*, where the dormitories consisted entirely of males. This, Wynne-Edwards believes, strongly supports his theory. However, in the hymenoptera, where the males are haploid, the sex-ratio can be very far from equality and the male population may not provide a relevant 'estimate' of population density. It is, therefore, still far from clear why mixed roosts of birds and hymenoptera are so common.

GENETICS AND BIOMETRY

LABORATORY,

GOVERNMENT OF ORISSA,

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