

*Chrysopa* was first reported from Punjab<sup>1</sup>. The biology of *Chrysopa scelestes* Banks was later reported from Layllpur<sup>2,3</sup>. This was followed by a collection and description of *Chrysopa cymbele* Banks from Layllpur<sup>4</sup>. Therefore, the present species is a new record from India. The biology of this insect indicates that the pre-oviposition period was  $4.4 \pm 0.5$  days, the oviposition period  $5.4 \pm 2.1$  days, the number of eggs laid by a female  $17.8 \pm 9.1$ , the egg period  $4.5 \pm 0.5$  days, the larval period  $22.4 \pm 1.6$  days, the pupal period  $9.9 \pm 2.2$  days and the adult life period  $23.1 \pm 2$  days. It was noticed that eggs of *Corcyra cephalonica* Stainton served as food for the larvae of *Chrysopa*. These observations agree with those of *Chrysopa scelestes* Banks which is also incidentally mass bred at Central Tobacco Research Institute for biological control of *S. litura* F and *M. persicae* Sulz on tobacco. A characteristic feature of this insect is that stalked eggs are laid in groups of 4-6 whereas in *C. scelestes* Banks eggs are laid singly and evenly distributed in a given area. The larvae are highly active and fed voraciously on *Corcyra* eggs, *M. persicae* Sulz, *Bemisia tabacci*, eggs, and just hatched larvae of *S. litura* F. The larva has a raised tail and the debris of food is heaped on its back as a shelter. A similar phenomenon was reported in many other *Chrysopids*<sup>5</sup>. The pupa is whitish and roundish. The adult in the lab fed on a mixture of protein hydrolysate, glucose, vitamin E and water given on a swab, readily. Possibilities of using the predator for biological control of *M. persicae* Sulz and *S. litura* F., in tobacco fields and nurseries are anticipated.

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## FIELD RESPONSE OF FINGER MILLET (*ELEUSINE CORACANA*) TO INOCULATION WITH *AZOSPIRILLUM BRASILENSE*

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THE occurrence of nitrogen-fixing *Azospirillum* in the roots of maize, sorghum, rice, wheat and several grasses is well known<sup>1-5</sup>. The beneficial effects of seed inoculation with *A. brasilense* on grasses, rice, wheat, barley, sorghum and fodder oats in pot and field trials have been reported earlier<sup>6-8</sup>. Finger millet, one of the minor millets, commonly known as *Ragi* (*Eleusine coracana*) is grown on an estimated 2.5 million ha in India and often fertilizer nitrogen is not adequately used in its cultivation. The present report deals with results of field experiments conducted at different locations in India to assess the effects of inoculating seeds of finger millet (*Ragi*) with *A. brasilense*. A carrier-based inoculant prepared from the laboratory-grown cultures was used to pre-treat the seeds<sup>8</sup>. Field experiments were conducted during rainy season of 1981-82 at Bangalore (Karnataka), Dholi (Bihar), Almora (U.P.) and Dindori (M.P.), using locally recommended varieties of the millet, at different levels of urea with and without *Azospirillum* inoculations.

Seed inoculation increased the straw and grain yield of finger millet at all locations ranging from 9.1 to 19.1% and 12.9 to 30.9% respectively (table 1), although it was statistically significant at Bangalore (for grain) and Dholi (for straw) centres.

A similar trend towards increase in grain yield due to seed inoculation with *A. brasilense* was seen when the inoculation was done in the presence of urea. The increase was, however, significant only in conjunction with 30 kg N/ha application at Almora centre to the extent of 128% over the corresponding control (table 1). In general, the results reveal that *Azospirillum* inoculation is beneficial for *Ragi* cultivation in the country.

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TABLE I

Response of finger millet (*Eleusine coracana*) to inoculation with *Azospirillum brasilense* Field trial (1981-82) (mean of 3 replications)

Treatments	Yield (q/ha)									
	Bangalore (var. PR-202)		Dholi (var. BR-2)		Almora (var. VI-204)		Dindori (var. PR-202)		All India mean	
	A	B	A	B	A	B	A	B	A	B
Uninoculated control (no nitrogen)	33.6	80.6	11.3	28.0	12.9	25.0	8.4	23.7	16.5	38.4
<i>A. brasilense</i>	40.3*	104.8	13.6	36.6*	14.3	29.4	9.1	26.8	19.5	49.4
1/3rd N level (urea)	40.8	98.3	14.8	35.8	16.2	39.3	9.0	25.0	20.0	49.5
1/3rd N level <sup>+</sup> <i>A. brasilense</i>	41.7	100.0	15.6	41.6	15.7	40.0	10.1	32.9	20.9	53.6
1/2 N level (urea)	41.6	105.2	15.4	38.4	17.3	40.2	11.4	35.0	21.4	54.7
1/2 N level <sup>+</sup> <i>A. brasilense</i>	43.7	105.0	16.3	43.6	12.4	40.1	12.3	38.2	21.2	56.7
Full N level <sup>+</sup> (urea)	46.4	108.6	19.5	43.6	13.9	54.2	12.5	37.2	23.1	60.9
Full N level <sup>+</sup> <i>A. brasilense</i>	47.1	113.9	20.6	45.7	31.7*	54.9	13.0	38.8	28.1	63.5
C.D. at 5%	3.95	N.S.	2.73	7.04	10.6	17.5	2.70	N.S.	—	—

A—Grain yield, B—Straw yield, +—Full N level—30 kg N/ha (urea), \*—Significant increase over corresponding control, N.S.—Not significant.

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