Table 1 *Levels of CE from Heliothis larvae from various locations*

Locations	μmol NPA hydrolyzed/g tissue/min
Hyderabad	10.5 ± 1.6*
Pantnagar	8.1 ± 2.4
Hissar	3.7 ± 1.3

Note: For conditions of reaction see text.
* ± values are standard deviations of the mean.

Table 2 I_{50} *values of the CE of Heliothis larvae from various locations*

Locations	*Sumioxon* × 10^{-5} M	*Carbaryl* × 10^{-5} M	*Eserine* 10^{-5} M
Hyderabad	0.477	0.256	7.594
Pantnagar	1.895	0.495	89.352
Hissar	7.703	2.105	113.963

Note: The activity of the enzyme was measured after it was incubated with the inhibitors for 2 min with sumioxon and 5 min with carbaryl and eserine.

by Pantnagar and least from Hyderabad. This was true for all the three inhibitors tested. The differences in the I_{50} values between the most susceptible population (Hyderabad) and the most resistant population (Hissar) ranged between 10 to 15-fold for all the 3 inhibitors tested (table 2). The results also suggested that carbaryl was the best inhibitor for the CE occurring in *Heliothis* populations obtained from various regions of the country.

Since the above differences are significant, one can speculate about their origin. Firstly these differences might just be due to the different biotypes or subspecies occurring in different parts of the country. Secondly, it is also likely that the inhibitor response reflects the resistance/susceptibility status of the species since the carboxylesterases have been shown to be implicated in the metabolism of both organophosphates and carbamates[7-9]. Further these differences can also be explained on the basis of the "mutant aliesterase" theory[10]. Extensive studies are under way to elucidate the reasons for these differences.

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SUMMER WEATHER DIE BACK OF COFFEE IN KARNATAKA

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THE Arabica coffee selections S 795 showed pronounced die-back in Ossoor Coffee Estate in Saklespur (Karnataka State) during March 1985. These are typical symptoms of summer weather dieback. Acervuli of *Colletotrichum* sp were found in great abundance on the bark of the mature twigs.[1] Later in the season, in May we came across several bushes including apparently healthy ones showing green new shoots dying backwards from the tips with darkened nodes and scorched leaves. Some of them had goose-neck symptoms and in some there was involvement of blossom also suggesting a bacterial plant pathogen.

Pseudomonas syringae van Hall was identified from the cultures based on tests suggested by Fahy and Persley[2]. The bacterial isolates were obtained using the

procedure adopted by Ramos and Shavdia[3]. We used King's B agar medium in place of proline agar[4] and confirmed Koch's postulates in the laboratory.

The association of *Pseudomonas syringae* with "dieback" or blight of coffee appears to be the first report from India. The disease was earlier recorded from South America and Kenya[5, 6]. The symptoms described from Kenya, especially Mount Elgon and Solai appear to be similar to those observed by the present authors in Karnataka.

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PERPETUATION OF BLAST PATHOGEN IN RICE STUBBLES

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THE rice blast pathogen *Pyricularia oryzae* Cav induces local lesions on host organs under favourable environment. The lesions on ragi leaf sheath were reported to serve as inoculum source after cutting[1]. The rice plant can regenerate tillers after harvest. Hence, the role of stubbles of the diseased plant in the perpetuation of rice blast fungus was studied and the results are reported in this communication.

The stubbles of blast-infected rice crop were collected from the field (average day/night temp. 29°C/21°C). The old plant material surrounding the culm was removed. It consisted of dried leaf sheaths, prophyllum and non-panicle bearing dead tillers. The plant parts dried and shrank together, thereby, the separate identification of each part became difficult. The term "debris" was used to describe them. The old plant material was divided transversly into two parts, the upper half included the cut ends of stubbles and the lower half surrounding the lower node. The debris and the innermost leaf sheath were separated for both the pieces, and were further divided into 20 × 5 mm samples. The stalk was longitudinally divided into two parts to see the colour of axillary bud. The debris, innermost leaf sheath and stalk culm samples were incubated under high humidity at 25 ± 1°C temperature for about 20 hours. The samples were subsequently observed under microscope and the fungal flora present on them was recorded.

The viable *P. oryzae* conidia were observed from the lower half of innermost leaf sheath and the stalk-culm samples. These plant parts were free from saprophytic fungi whereas numerous *Fusarium*, *Alternaria* and *Curvularia* spores were found to be present on debris and near the cut ends of stubbles (table 1).

The axillary bud was dark brown in colour. The *P. oryzae* cultures isolated from stubbles were of wild type (dark coloured) and survived well for four months at 30–39°C without subculturing.

The pathogen was virulent but it could not compete with facultative saprophytes and hence was not de-

Table 1 *The fungal flora present on stubbles of blast infected rice crop*

Host organ	Fungal flora present			
	Fusarium	*Alterneria*	*Curvularia*	*Pyricularia*
(1) *Dead plant material				
(a) Debris of upper half	+	+	+	0
(b) Innermost leaf sheath of upper half	+	+	+	0
(c) Debris of lower half	+	+	+	0
(d) Innermost leaf sheath of lower half	0	0	0	+
(2) Stalk culm	0	0	0	+

* refer materials and methods; + = Present; 0 = Absent