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Evaluation of sex pheromone components of rice leaf folder, *Cnaphalocrocis medinalis* Guenee

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Different blends of (Z)–13–18:AC, (Z)–11–16:AC and (Z)–13–18:OH were evaluated for the pheromonal activity to rice leaf folder, *Cnaphalocrocis medinalis* under field conditions. Mixture of (Z)–13–18:AC and (Z)–11–16:AC in the ratio of 10:1 was pheromonally active and captured relatively larger number of male moths than traps baited with two Virgin females. Addition of (Z)–13–18:OH to the mixture reduced the trap capture. Polythene vial dispensers were superior to rubber septa.

RICE leaf folder, *Cnaphalocrocis medinalis* Guenee has recently emerged as a major pest in all the intensively rice-growing areas[1]. Chemical control, so far, has been the main method of controlling the pest. Insect sex pheromones have promised to render the insecticide more effective by helping in timing the insecticide application, besides acting as practical means of direct control[2,3].

Studies made to identify the pheromone components of *C. medinalis* through electroantennographic (EAG) and gaschromatographic (GC) analyses with ovipositor washings of Virgin females at Overseas Development Administration, Natural Resources Institute, Kent, UK indicated that a mixture containing (Z)–13–octadecenylacetate (Z–13–18:AC) and (Z)–11–hexadecenylacetate (Z–11–16:AC) at approximately 100:5–10 ratio were pheromonally active to male moths of *C. medinalis*. (Z)–13–octadecenol (Z–13–18:OH) was also found associated with pheromonal activity (Hall, D. R., pers. commun.). Based on these results, samples of the blends consisting of variable quantities (0, 10, 50, 100, 500 μg) of (Z)–11–16:AC, each mixed with 1000 μg of (Z)–13–18:AC dispensed in rubber septa, were evaluated in field trials organized in Medchal area (Operational Research Project site of Directorate of Rice Research) during wet (*kharif*) and dry (*rabi*) seasons of 1991–92 and the results are presented here.

The pheromone blends dispensed in rubber septa containing 1 mg mixture were baited in delta sticky traps during wet season. The traps were positioned at crop canopy level in rice fields infested by leaf folder (*C. medinalis*) synchronizing with the moth emergence at 20 m apart. The trial had four replicates spaced at 100 m. The trap captures were collected and counted daily for over 10 days. The trap positions were interchanged after each count. Based on the results of EAG and GC analyses and of the first season field trials, pheromone blends consisting of variable quantities (50, 100, 200, 300 μg) of (Z)–11–16:AC mixed with fixed quantity (1000 μg) of (Z)–13–18:AC along with a single treatment consisting of all three components (Z–13–18:AC, Z–11–16:AC and Z–13–18:OH) in 1000:100:100 ratio dispensed in rubber septa and polythene vials were evaluated during dry season.

Mixture of (Z)–13–18:AC and (Z)–11–16:AC recorded consistent trap captures while (Z)–13–18:AC either alone or in combination with (Z)–13–18:OH failed to do so, thus indicating the former mixture to be the probable pheromone of *C. medinalis*. These results also indicated that probable proportion of (Z)–11–16:AC in the mixture to be around 50 to 100 μg from the consistent larger catches than with other combinations. Similar observation was recorded in dry season of 1992 wherein the trap captures were significantly larger with 50–100 μg of (Z)–11–16:AC than with other combinations. These observations were in conformity with EAG–GC analytical results wherein the quantity of (Z)–11–16:AC was estimated at 5–10% of the (Z)–13–18:AC in the pheromone mixture (Hall, D. R., pers. commun.). Number of male moths with pheromone dispensers was greater than with one and two virgin female moth baits.

Addition of (Z)–13–18:OH to the best blend (i.e. Z–13–18:AC and Z–11–16:AC in 1000:100 ratio) significantly reduced the trap capture, indicating an inhibitory role of the chemical component at this level. Results of these trials reveal that the pheromone composition of *C. medinalis* contains a mixture of (Z)–13–18:AC and (Z)–11–16:AC in the ratio of 100:5 to 10 respectively.

Among the dispensers evaluated polythene vial was superior to rubber septum with the significantly larger trap captures with all the treatment combinations evaluated.

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Association of keratinophilic non-dermatophytic fungi with skin diseases of ruminants

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Keratinophilic non-dermatophytic fungi have increasingly been reported from various pathological conditions of man and animals. In the present study, a large number of keratinophilic non dermatophytes was recovered culturally from ruminants (cattle, buffalo, sheep and goat) having skin disorders. The isolated fungi included *Alternaria* sp. (37.25%), *Aspergillus* sp. (2.94%), *Beauveria bassiana* (4.90%), *Chrysosporium keratinophilum* (0.98%), *Chrysosporium indicum* (0.98%), *Curvularia* sp. (2.94%), *Paecilomyces lilacinous* (1.96%), *Penicillium* sp. (2.94%) and *Pseudarachiniotus flavoluteus* (1.96%).

KERATINOPHILIC non-dermatophytic fungi have increasingly been reported in the recent past from man, animals and soil[1]. These fungi are often designated as opportunistic and their occurrences in nature have been greatly influenced by ecological factors. Some keratinophilic fungi by way of their property to break down the soil debris have become potentially pathogenic for man and animals. In the past, their role as etiopathogen was ignored but now they are given more importance for their involvement with various pathological conditions. Since no comprehensive information is available from India and, particularly from Uttar Pradesh, on the prevalence of keratinophilic non dermatophytes associated with skin disorders in ruminants, the present study was undertaken.

A population of 4534 animals comprising 1062 cattles, 768 buffaloes, 1049 sheeps and 1655 goats were screened at different parts of Uttar Pradesh, India during 1987–88, out of which skin scrapings were collected from 102 animals having skin disorders. Collected specimens were subjected to direct microscopic examination under 10% KOH mount. Sabouraud dextrose agar was used for primary isolation of fungi. The recovered fungi were identified according to Campbell and Stewart[2].

The overall occurrences of clinical cases irrespective of species were 2.25%. Of the four species, sheep (4.19%) was found mostly susceptible to dermatomycoses followed by cattle (1.98%), goat (1.69%) and buffalo (1.17%) (Table 1).

Microscopic examination of the specimens revealed muriform conidia of *Alterneria* sp. in 26.47% specimens except in cattle, *Curvularia* sp. in 7.84% cases except in cattle and buffalo samples.

Culture of specimens on Sabouraud dextrose agar, however, yielded large number of keratinophilic non dermatophytes from the specimens. The isolated fungi included *Alternaria* sp. (37.25%), *Aspergillus* sp. (2.94%), *Beauveria bassiana* (4.90%), *Chrysosporium keratinophilum* (0.98%), *Chrysosporium indicum* (0.98%), *Curvularia* sp. (2.94%), *Paecilomyces lilacinous* (1.96%), *Penicillium* sp. (2.94%) and *Pseudarachiniotus flavoluteus* (1.96%). Of the four species, sheep and goat showed higher fungal loads on their body surfaces as culturally more isolates could be detected from these species of animals. The details of the fungi isolated species-wise are given in Table 2.

Isolation of various keratinophilic non dermatophytes indicates the extent of fungal load on the body surfaces of the animals and vulnerability of their skin surfaces. Reports of cutaneous alternariosis are not so far available in these species of animals but *Alternaria* sp. has been reported from skin disease of dog[3] and skin lesions of man[4]. The isolation of *Aspergillus* sp. from the skin surfaces goes with the observation of Sinha[5] from cattle and Nooruddin *et al.*[3] (*loc. cit.*) from goats. But report regarding sheep is so far silent. *B. bassiana* is so far not reported from animals but isolation was made from mycoses in tortoises[6]. Isolation of *C. keratinophilum* from cattle is supported by Takatori *et al.*[7] and Bagy[8] who also noted skin infection due to this fungus. Reports regarding the *P. lilacinous* from sheep and goats are not available but this fungus has been

Table 1. Overall occurrence of clinical cases versus culturally positive cases

Animals	No. of animals	Clinically positive cases	Positive cases under KOH mount	Culturally positive cases
Cattle	1062	21 (1 98)	0.0	10 (47.62)
Buffalo	768	9 (1.17)	2 (22 22)	3 (33.33)
Sheep	1049	44 (4.19)	21 (47.72)	28 (63 64)
Goat	1655	28 (1.69)	12 (42.86)	17 (68.71)

Figures in parentheses indicate percentage.