



FIG. 5. Web of *Hyptiotes himalayaensis* sp. nov.

Abdomen: Longer than wide, strongly convex on the middle, clothed with thick hairs and there are tufts of hairs on the dorsal side of abdomen as in Figs. 1 and 2. Ventral side uniform dark colour but just below the epigastric furrow there are small chalk-white irregular patches. Epigyne as in Fig. 3 and internal genitalia as in Fig. 4.

Holotype: One female in spirit and epigyne in a microvial along with holotype.

Type-locality: Simla, Himachal Pradesh, India 1-4-1980. Coll. S. K. Das.

This species appears to be closely related to *Hyptiotes indica* Simon. However *Hyptiotes himalayaensis* sp. nov. differs from *H. indica* by the structure of female epigyne as well as internal genitalia. Abdomen provided dorsally with tuft of hairs but abdomen of *H. indica* without tuft of hairs.

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REDUCTION IN PATHOGENIC AND SAPROPHYTIC FUNGI IN MAIZE, CHILLI AND PADDY SEEDS BY HYDROCHLORIC ACID VAPOUR AND SOAKING IN HCl SOLUTION TREATMENT*

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SEVERAL fungicides and physical treatments are employed to control pathogenic fungi associated with seeds¹⁻⁷. Hydrochloric acid gas has been used to kill fungal spores in empty petri dishes⁸. In the present study, concentrated HCl vapour and soaking in hot dilute hydrochloric acid under various conditions have given significant reduction in pathogenic and saprophytic fungal counts in maize, chilli and paddy seeds on a laboratory scale.

Application of HCl Vapour in a Jar

About 5 ml of concentrated HCl is poured on the floor of a specimen jar (40 × 30 × 20 cm). Seeds are placed in an open petri plate and the lid closed with vaseline. Seeds were removed after 1 hour.

Application of HCl Vapour in Plastic Bag

Two drops of concentrated HCl are placed in a 20 × 12 cm plastic bag and the neck closed. The bag is shaken to disperse the HCl. About 400 test seeds are placed in the bag and the neck closed tightly with a string. The seeds are shaken for 1 min at 10 min intervals for a total of 1 hour to ensure HCl vapour treatment all round the seeds. Using a 30 × 45 cm plastic bag a 500 gm paddy (masuri) sample was treated similarly using 1.5 ml concentrated HCl.

Treatment by soaking

Seeds were soaked in HCl solution in water. The percentage of various fungi was obtained by the blotter method using 200-400 seeds and incubating for 7 days at room temperature (20-25°C) in natural daylight or under near UV light.

In all treated seeds the apparent germination was improved probably due to suppression of the saprophytes. Germination tests and observations were based on appearance of the root in the plates. The

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standard germination test² was carried out on the 500 gm paddy sample. In chilli seeds, HCl vapour treatment in a jar caused 64% reduction in the incidence of *Colletotrichum dematium* and 28% increase in germination.

In maize CM-500 seeds, the content of *Fusarium*, *Aspergillus niger*, *A. flavus* and *Penicillium* spp. reduced by 73-90% of the untreated control, in heavily infected samples by a single treatment with HCl vapour in jar. The percentage germination of maize seeds increased from 54 to 99.

In a series of experiments on paddy (masuri) seeds, important pathogens *Trichoconiella padwickii* and *Drechslera oryzae* were significantly reduced (upto 70%) in heavily infected samples and the germination percentage increased by 20% by one treatment with HCl vapour in a jar or plastic bag as well as by soaking in 1:4 (HCl:H₂O) solution at 52-57°C for 30 min. Similar results were obtained with a 500 g sample of paddy. A marginal increase in the count of saprophytic fungi was also seen.

In the vapour methods, the concentration of HCl built up in the jar or plastic bag is not expected to exceed 50% because of the presence of air. The methods used to achieve the reduction of fungi are simple, inexpensive and amenable for large scale operation and after further checks on the actual yield of paddy, could be directly used by farmers to reduce pathogenic fungi in seeds prior to sowing. HCl vapour treatment done in a plastic bag would cost 1 to 2 paise per kg of paddy seeds as compared to 20-30 paise per kg paddy using the available chemical

formulations. HCl being volatile, does not leave any residual chemicals unlike the currently used fungicides. This treatment is expected to improve the storage life of seeds.

Details of the method and additional data may be obtained from the authors.

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