pH 8.5. Growth of the organism decreased in the alkaline range at the level of more than pH 8.5 of the culture medium (figure 1). Microscopic examination revealed that the filaments were devoid of branches in the acidic pH. Distinct branching was observed in the alkaline pH and pH 9.5 was found to be the most effective one where the frequency of branching was observed as the maximum (figure 1). Each alternate cell or even each cell of the filament grown at pH 9.5 was found to develop a branch initial. The pH which was most effective for the best growth of the alga was found ineffective at the same level for the highest degree of branching development, thus suggesting an independent role of hydrogen-ion-concentration for the branching initiation. It appears that the degree of branching is rather a function of hydrogen-ion-concentration of the growth medium and to an appreciable extent it is independent of the growth rate of the organism.

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1. Pringsheim, E. G., *Pure Culture of Algae*, Cambridge Univ. Press, Cambridge, 1946.
2. Sahu, J. and Adhikary, S. P., *Arch. Hydrobiol. (suppl.)*, 1982, **63,** 189.
3. Allen, M. B. and Arnon, D. I., *Plant Physiol.*, 1955, **30,** 366.
4. Fogg, G. E., *Ann. Bot.*, 1949, **13,** 241.
5. Adhikary, S. P. and Pattnaik, H., *Hydrobiologia*, 1979, **67,** 241.
6. Brock, T. D., *Science*, 1973, **179,** 480.

Figure 1. Agaricoid fruit bodies of *Strobilurus stephanocystis* on Pinus cone.

STROBILURUS STEPHANOCYSTIS (HORA) SINGER—A NEW RECORD FROM INDIA

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DURING surveys in May and July, 1986 in the forest areas of Himachal Pradesh, a very interesting specimen of *S. stephanocystis* (Hora) Singer was collected from Matiana (H.P) (2500 Meter, msl). The fruit bodies of the fungus were growing on fallen and decaying cones of *Pinus* sp and *Cedrus deodara* (figure 1). The sporophores were agaricoid, stalked and tough. Pileus 0.4 to 1.5 cm in dia, thin, convex, hemispherical, umbonate specially in young specimens, brown to dark brown at the centre, cream coloured and striated at the margins. Lamellae numerous, cream coloured, adnate with lamellulae of 1–3 unequal length. Stipe 2–4 × 0.3 cm, central, hollow, dark brown to black in the lower 3/4th portion, light brown above and hyaline to creamish at the top, uniform in thickness, tough, attached to the substratum firmly with a long tapering, dark brown pseudorrhiza. Dermatocystidia present. Caulocystidia numerous, hyaline, ventricose with broadly obtuse rounded tips, very long, 60–70 × 4.5–6 mμ. Pilocystidia numerous, ventricose, hyaline, 30–36 × 3–4 mμ with swollen obtuse tips. Pleurocystidia numerous, clavate, hyaline, 34–40 × 8–10 mμ. Cheilocystidia rare, ventricose, 18–20 × 3.5–4.5 mμ. Hymenophoral trama regular. Basidia clavate, 4 spored, 8–10 × 2 mμ. Basidiospores white in mass, hyaline, smooth, inamyloid, acyanophilic, ellipsoid to narrowly subfusoid with a suprahilar depression and 5.5 × 3.5 mμ. Mycelium 5–6 mμ thick, septate and branched. Clamp connections absent.

Only four species of this genus have been recorded throughout the world on pine and spruce cones and inflorescence of Magnoliaceae[1]. *S. esculentus* (Wulf apud Jacquin: Fr) Singer has earlier been reported

from India on decaying cones of *Picea smithiana*[2]. The present collection is a new record of the species from India. Some of the species of the genus are edible and Marasmic acid (an antibacterial substance) has been isolated from *S. conigenus* (Pers ex Fr) Karst. These aspects are being studied with the present material.

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1. Singer, R., *J. Cramer.*, 1975, 349.
2. Rawla, G. S., Arya, S. and Narayana, J., *Indian J. Mycol. Plant Pathol.*, 1984, **14**, 247.

INTRODUCTION AND ESTABLISHMENT OF *ZYGOGRAMMA BICOLORATA* ON *PARTHENIUM* HYSTEROPHORUS AT BANGALORE, INDIA

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PARTHENIUM HYSTEROPHORUS L, native to Mexico and the adjacent USA[1], was first observed[2] in Pune in 1955 and has now spread throughout the country infesting about 5 million hectares of land[3]. Nearly one-third of the 122 km^2 city area of Bangalore is infested by *Parthenium*. In addition to encroaching into agricultural and pasture land, the weed constitutes a public health hazard[4]. In India a number of indigenous insects have successfully transferred to *Parthenium*[5], but none of them cause appreciable damage to the weed.

Surveys in Mexico have resulted in the discovery of a large number of insects attacking *Parthenium*[6]. *Zygogramma bicolorata* Pallister (Coleoptera: Curculionidae), one of the insects identified in the above study, was imported from the Mexican sub-station of the Commonwealth Institute of Biological Control in April 1983. Host-specificity tests conducted under quarantine conditions confirmed the safety of this insect for field liberation in India[7].

Field releases were carried out in the Sultanpalya area of Bangalore, where an undisturbed stretch of about 10 ha of a pure stand of *Parthenium* was located. A total of 6 releases, consisting 1410 laboratory reared adults, were made between 11th July and 18th August 1984. Releases were confined to an area of about 500 m^2 at the middle of the site and observations on establishment and dispersal were taken at monthly intervals.

Adults and larvae of *Z. bicolorata* feed on *Parthenium* leaves. The eggs are laid singly or in small groups up to 5, mostly on the undersurfaces of the leaves, and hatch in 4–5 days. The early stage larvae feed on the terminal and axillary buds and move on to the leaf blades as they grow. The full grown larvae entered the soil and pupated. The larval and pupal periods under laboratory conditions lasted 10–15 days and 8–10 days respectively at 28 ± 2°C. McFadyen and McClay[8] reported that females are capable of laying up to 1786 eggs (mean 836.13).

Establishment of *Z. bicolorata* was observed at the release site in September 1984. By the middle of October the beetle population increased to 1.8 per plant (range 0–6) in the 500 m^2 release area. Eggs and larvae were also noticed on most of the plants and a slight dispersal to about 2 ha was also observed. However, by the second week of November the *Parthenium* plants started drying up followed by a reduction in the beetle population.

From December 1984 to August to 1985 the insect could not be located in the field, although stray *Parthenium* plants were present. *Z. bicolorata* again made its appearance from the third week of September to the middle of November, 1985 after which it again disappeared. During its brief appearance the insect population, which was restricted to about 2 ha, did not exceed 0.01 adults per plant.

A perusal of the rainfall data for Bangalore city indicated that the field activity of *Z. bicolorata* coincided with periods of heavy rainfall. The insects were active during July, August, September and October 1984 when the corresponding rainfall figures were 146, 45, 243.6 and 144.8 mm. Between November 1984 and April 1985 when 0–20.7 mm of rains were recorded *Z. bicolorata* was not observed in the field. The beetle was inactive even during May to August 1985 with 67.8 to 81.4 mm of rainfall. Adults were once again observed in the field in September 1985 when the total rainfall was 139.8 mm. After being active during October and November with 70.9 and 97.3 mm of rainfall the insect disappeared in December 1985 when the rainfall was only 3 mm. However, continuous breeding of the insect was possible under laboratory conditions.

It is thus evident that *Z. bicolorata* undergoes