pollen morphology is an effective tool in varietal taxonomy. It is therefore suggested that in any consideration of taxonomic categorization of the spinach varieties, the Japanese and Indian specimens of the plant should be treated at least as distinct varieties and named accordingly, as *Spinacia oleracea* var. *japonica* and *S. oleracea* var. *indica* respectively.

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SHORT SCIENTIFIC NOTES

Discovery of Middle Palaeozoic Fossils from Southern Lahaul

The present note records the find of tabulate corals from the black calcareous splintery shales exposed 1·5 km from the Tandi bridge on the Chandra-Bhaga river in southern Lahaul. The fossiliferous rock has well-developed slaty cleavage and shining appearance. The shales are interbedded at places with bands of limestone, calcareous sandstone or quartzite and lie above the light green schists and quartzites. The occurrence of pebbly beds has also been noticed above the fossiliferous shales between Sisu and Tandi. This sequence had earlier been considered to be of Precambrian age[1]. The find of tabulate corals from the black splintery shales rules out the possibility of the entire sequence to be of Precambrian age. The coral specimens are poorly preserved with slender and polygonal corallites. The specimens belong to the family Favositidae[2] Dana, 1946 and may include representatives of the genus *Favosites* suggesting at least Middle Palaeozoic (Silurian or Devonian) age for the fossiliferous beds. The overlying Tandi Limestone has yielded Triassic conodonts. The authors believe that a major stratigraphic gap represented by a disconformity separates the black splintery shales from the Tandi Limestone.

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Hentriacontanol from *Cyperus iria*

Oil of *Cyperus rotundus* Linn. of Indian, Japanese and Chinese origin has been examined by three independent groups[1-3]. Sorm and coworkers reported the isolation of cyperine and a tricyclic sesquiterpene of unknown structure from the plant of Chinese origin. Nerali *et al.* while working on the *Cyperus scariosus* oil, which contains cyperene as a major constituent, reported the isolation of rotundene and rotundenol[4].

Following these investigations presence of sesquiterpene ketones was expected from *Cyperus iria* which is used as a tonic, stimulant and astringent.

Shade-dried rhizomes of plant *Cyperus iria* were extracted with petroleum ether at room temperature. The major fraction, a solid colourless compound, was found to be a known aliphatic alcohol identified as hentriacontanol. (Hentriacontanol $C_{31}H_{64}O$, m.p. 81°–82° C; Acetate $C_{33}H_{66}O_2$, m.p. 74°–75°). It was confirmed by mixed m.p., spectral data and its acetate.

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Incidence of Nymphal Stages of *Hyalomma marginatum isaaci* Sharif, 1928 in Cattle in India

Kaiser and Hoogstraal (1964) stated that the host pattern of the immature stages of *Hyalomma marginatum isaaci* was not known but was likely to be similar to the *marginatum* complex in a wide range of ground feeding birds. Singh and Dhanda (1965) mentioned the occurrence of nymphs on *Lepus nigricollis* whereas Kamath (1967) and Jagannath *et al.* (1973) recovered nymphs of this tick from sheep and pig respectively.

A large number of ticks were found on the body and external ear of a cow, which had persistent temperature and did not respond to treatment with antibiotics in Belakhundi village, Raichur District, Mysore State. Ticks collected from the animal and other cattle and calves in the same herd consisted of 125 adults and 32 nymphs. The males, females and nymphs were identified as *Hyalomma marginatum isaaci* based on the description given by Sharif (1928) and Singh and Dhanda (1965) respectively. The nymphs recovered showed various stages of engorgement. The nymphs were grey in colour and ovoid in shape. The smallest and largest nymphs in the collection measured 1·3 × 2·4 mm and 1·7 × 3·0 mm respectively. Some of the nymphs were kept for moulting at laboratory conditions at an average minimum temperature of 14·6° C—maximum 26·3° C. They moulted and reached the adult stage in 17–20 days after removal from the host. There appears to be no record of the presence of nymphal stages on cattle. To the authors' knowledge the record of nymphs of *Hyalomma marginatum isaaci* in cattle in India is the first of its kind.

The authors wish to express their thanks to Dr. R. D. Nanjiah, Director of Instruction (Vety.), University of Agricultural Sciences, Bangalore, for his interest in this work.

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Note on the Effect of Nitrogen and Spacing on the Protein Content of Rice (*Oryza sativa* Linn.)

A field experiment at varying levels of nitrogen and spacing was conducted at the Agricultural College, Vellayani, during 1970–71, using rice variety Culture-12035 (isolated from a cross between IR8 and Annapurna evolved at C.R.R.S., Pattambi). Treatments consisted of four levels of nitrogen (60, 80, 100 and 120 kg/ha) in combination with 3 spacings (10 cm × 10 cm, 10 cm × 15 cm, 15 cm × 15 cm). After the harvest, the nitrogen content in the sample of grains was estimated by Micro-kjeldahl-Gunning method and multiplied by 6·25 to calculate the protein percentage.

The results showed that the effect of nitrogen levels and spacing was significant in increasing the percentage of protein in grain. However, the interaction was found insignificant. Increasing levels of nitrogen application produced corresponding increases in protein percentage of grain in all cases. At high nitrogen level (120 kg nitrogen/ha), the protein content of grain was 9·03%. Increase in spacing also resulted in an increase in the protein content of grain. Spacing of 15 cm × 15 cm recorded protein percentage of 8·69.

The first author is thankful to the Indian Council of Agricultural Research, New Delhi, for the award of a Junior Research Fellowship.

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A New Host Record for *Phomopsis* Sp.

During October-November 1972, the authors noticed a leaf spot disease on *Sapindus emarginatus* Vahl (commonly known as Reetha). The plant is of great economic importance in India as the fruits of this plant are used as substitute for soap and also in medicine. The disease starts as small pinhead ash coloured spots on the upper surface of the leaf blade. Mature spots are irregular, ash coloured in the central region with a yellow halo. Pycnidia appear in the central region as small black dots. Chief veins are freely traversed.

On examination the pathogen was identified as *Phomopsis* sp. Pycnidia dark-brown, globose to subglobose, superficial, 48–92 μ, average 68 μ, in diameter; conidiophores small, hyaline; conidia

hyaline, single celled, oval, guttulate, 8–16 × 4–6 μ, average 12·5 × 4·5 μ.

The specimen has been deposited in CMI, Kew, England, IMI No. 171788.

Three species of *Phyllosticta*, viz., *P. sapindi*[4] P. Henn. on *Sapindus saponaria* L., *P. raimundi*[5] Sacc. on *Sapindus* sp. and *P. sapindi-emarginati* Rao[7] on *Sapindus emarginatus* have been reported. The present *Phomopsis* sp. resembles the above described *Phyllosticta* sp., in the absence of beta conidia. But it is differentiated in the absence of true pycnidial wall and presence of guttulation. Hahn[2] (1930) described several species of *Phomopsis* on conifers which lack beta conidia and considered them "atypical" of the genus and an imperfect stage of *Phacidiella* (Hahn, 1957)[3]. Funk (1970)[1] considered Hahn's "atypical" *Phomopsis* sp. as the perfect stage of *Potebniamyces*. Presence of guttulation in the conidia has been considered as a differentiating character between *Phyllosticta* and *Phomopsis* (Sutton, 1969)[6].

There is no record of any *Phomopsis* sp. on any *Sapindus* sp., *Sapindus emarginatus* is a new host record for the fungus from Jabalpur.

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Luminescent Bacteria from Porto Novo Waters of South-East Coast of India

The production and display of luminescence is one of the characteristics of many marine organisms. Light production is almost unknown among fresh-water organisms except for a few fresh-water limpets, but it is known to occur with some degree of certainty in 10 phyla and 35 orders of marine organisms. The present note deals with the cultural, morphological and physiological characteristics of luminescent or psychrophilic (mean-cold loving) bacteria of South-East Coast of India especially from Porto Novo water (11° 29′ N and 79° 49′ E).

Freshly collected marine (*Caranx* sp., *Cybium* sp., *Lactarius* sp., *Trichiurus* sp.) and estuarine (*Therapon* sp., *Mugil* sp., *Arius* sp.) fishes were kept in refrigerator for 2 days between 4° and 8° C. Skin scrapings were suspended in 10 ml of sterilised distilled water. The suspended material was streaked on petri plate containing agar medium of 0·5% peptone and 1·0% glycerine prepared in stored, aged sea-water of 31 to 32% salinity and incubated at 4° to 8° C. The presence of luminescent colonies was observed in the dark after 48 hours of incubation and the above colonies were identified as *Aeromonas* sp. on the basis of morphological and cultural characteristics as described in *Bergey's manual* (1957)[1]. The determinative scheme suggested by Shewan (1963)[2] was also followed.

The luminescent or psychrophilic bacteria were all gram-negative bacilli, motile with polar flagella capable of fermenting sugars like glucose, mannose, galactose, fructose, sucrose, maltose and dextrose. Many of the isolates failed to ferment zylose, sarbose. rhamnose, raffinose and inositol though they showed varying degree of growth. All the strains hydrolyse starch, coagulate milk, liquefy gelatin, produce indole and H_2S and reduce nitrates to nitrites. Some isolates produced characteristic of red pigments. No bioluminescence was observed from colonies grown on distilled water medium. Absence of glycerol in sea-water medium and also temperature above 15° C resulted in colonies with no bioluminescence. The psychrophilic bacterial count was also poor at higher temperature as compared to that of lower temperature.

The light emitted by the strain *Aeromonas* sp., was cold light which the radiant energy was confined to the visible regions. The light production showing diurnal periodicity is one of the interesting features of the above bacterium *Aeromonas* sp.

Grateful acknowledgement is due to Prof. R. V. Seshaiya (late) for the facilities provided.

Government of India, Off-Shore Fishing Station, Kandla 370220, India, *June* 25, 1973.

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