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Alligator Weed in Indian Lakes

Alternanthera philoxeroides (Mart.) Griseb., a South American weed of the family Amaranthaceae, has been found in the lakes and water pools in the eastern parts of India, namely, West Bengal and Bihar. This species was introduced long ago in the tropics of the Old World, but its introduction into India has taken place during late years. In 1875, Otto Kuntze found this species growing in the vicinity of Java, where it has now become established in stagnant or slow-moving water[1,2]. In the Calcutta Herbarium there is a specimen from Victoria Lake in Rangoon district, Burma, collected in 1932 by C. E. Parkinson. This note is probably the first record of its occurrence on the Asiatic mainland. Apparently the species has made further ingress in Eastern India. Like several other American weeds, it seems probable that a few viable seeds of this species might have reached India along with some packing material during the Second World War. This is conceivable in view of the fact that this species was collected for the first time in India near an aerodrome at Calcutta. During recent years, a large number of neotropical weeds have been found to naturalize on Indian soil and spread like wildfire[3]. Further, in this species reproduction takes place vegetatively by means of subterranean shoots, and thus under favourable conditions it spreads rapidly, forming dense masses.

It has been observed that an organism often multiplies rapidly when carried to a new environment. Water hyacinth (*Eichhornia crassipes*) in S.E. Asia, the Nile and Congo, *Lantana* in India, prickly pears (*Opuntia*) in Australia and India, Noogoora burr (*Xanthium pungens*) in Queensland, and rabbits in Australia are familiar examples[4,5]. In North Carolina, U.S.A., alligator weed has already become a troublesome aquatic pest[6]. It is possible that, in time, this weed may also become another powerful aquatic pest in Indian lakes, ponds, puddles and waterways. It would be worth while to watch the spread of this weed in other parts of the country. The correct nomenclature and synonymy of this species is as follows: *Alternanthera philoxeroides* (Mart.) Griseb. in Abh. Ges. Wiss. Goett. 24: 36. 1879; Kuntze, Rev. Gen. Pl. 2: 540. 1891; Schinz in Engl. and Prantl, Nat. Pfam. 3. 1a: 115. 1893; Backer in Fl. Males. Ser. I. 4(2): 93. 1948; Hardin in Castanea 24: 22. 1959; Duke in Ann. Miss. Bot. Gdn. 48(4): 43. 1961; Backer and Brink, Fl. Java 1: 238. 1963. Basi. *Bucholzia philoxeroides* Mart. in Nova Acta Acad. Leop.-Carol. 13(1): 315. 1826. Syn. *Telanthera philoxeroides* Moquin-Tandon in DC. Prodr. 13: 362. 1849, incl. vars. *Achyranthes philoxeroides* (Mart.) Standl. in J. Wash. Acad. Sci. 5: 74. 1915.

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MICROBIOLOGY

Radiochemical Determination of the Endogenous and Exogenous Respiration of Bacterial Spores

THE respiration of the dormant spores of aerobic bacteria is always very small, and therefore difficult to measure. Though various authors had given very much larger values for the respiration (Q), H. Halvorson *et al.*[1] have come to the conclusion, based on a consideration of the limitations of the manometric techniques employed, that the true value of Q must be less than 0·05 for spores of *Bacillus cereus* even in presence of glucose—much less than for vegetative cells. (Q is generally given as μl. oxygen absorbed per mg and h; but for respiration of carbohydrate this is identical with μl. of carbon dioxide produced per mg and h.) An actual value could, however, not be given by Halvorson *et al.* We have now put to use the extraordinary sensitivity of radiochemical methods to measure both the endogenous and the exogenous respiration. For reasons of economy, the radiocarbon was introduced into the bacteria in the form of photosynthate.

An extract of green leaves which had assimilated radioactive carbon dioxide in the light was deionized successively with a cation and an anion exchange resin ('Lewatit *KS*' and 'Lewatit *MN*'). The extract was added to *G*-medium[2], *B. cereus* was grown in this radioactive medium with aeration, and sporulation followed there. The spores were collected by centrifugation, separated from remaining vegetative forms and cell debris by partition in a two-phase system[3], and washed twenty times with distilled water. No vegetative forms remained with the spores, as was shown by Möller staining. After sterilization and addition of yeast extract, calcium chloride and dipotassium hydrogen phosphate, the radioactive *G*-medium could be used again. Altogether about 300 mg of radioactive spores were obtained and dried over silica gel. The specific activities were up to $6{\cdot}6 \times 10^6$ disintegrations per min (d.p.m.) and mg. The spores were kept in the dry state at −25° C for 1–7 months before the experiments were performed. They were not heat-shocked.

The spores (32–72 mg in different runs) were suspended in 40 ml. distilled water or solution, so that the concentration was about $0{\cdot}7 - 1{\cdot}5 \times 10^9$ spores/ml. To measure respiration, the spores were kept in a thermostat in a slow current of air free of carbon dioxide, into which before the end of the run a known amount of carbon dioxide was injected. After contact with the spores, the gas was passed through 30 ml. 1 N sodium hydroxide. After the run, the carbonate was precipitated with barium, and the barium carbonate filtered off. For measurement, carbon dioxide was set free with perchloric acid, introduced into a gas counter[4,5], and measured until the standard error could be considered to be sufficiently small—generally 100 min. In every case, two parallel runs were made, and agreement was always reasonable.

The main results are : Dry spores gave no measurable activity at room temperature (22° C) or at 35° ; in these experiments, Q must have been $< 10^{-3}$ and $< 10^{-4}$, respectively. Spores kept in distilled water gave measurable Q