

remain to be seen from further detailed investigation.

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CORRELATION BETWEEN METHODS OF AVAILABLE NITROGEN WITH CROP RESPONSES

THE rate of change of organic nitrogen is the major soil characteristic that correlates with the capacity of soil to supply nitrogen to crops. The incubation method proposed by Stanford and Hanway (1955)³ showed good correlation with crop responses in arable soils, but in paddy soils nitrification could be hardly an index of the availability of nitrogen. Attempts were made to characterise the nature and decomposability of organic nitrogen by using alkaline potassium permanganate as the reagent.

For the purposes of evaluating the fertility status and predicting crop responses to fertilizers, the per cent responses due to the application of particular nutrient is taken as the measure of availability of that nutrient in the soil. So, in order that the soil test may be of any value it becomes essential to correlate and calibrate the soil test method values with per cent responses in green-house and field experiments.

With this object in view, three different methods: (i) Alkaline potassium permanganate⁴; (ii) Rapid Iowa nitrification³; (iii) Richardson's modification of Olsen's method² were tried in the laboratory and the values were correlated with per cent responses, obtained in green-house and field experiments due to application of nitrogen. The bulk soil samples were brought from different agronomic centres and the green-house experiments were conducted at I.A.R.I., New Delhi. For field experiments the soil samples from the control plots for analysis and the yield data were obtained from the various centres where agronomic trials in the cultivators' fields were conducted on a country-wide soil fertility programme by I.C.A.R., and State Departments of Agriculture. They presented a wide variety of soils and climates. Their pH, calcium carbonate content, available nitrogen, available phosphorus and available potassium

also varied widely. The texture of soils was from sandy loam to clay.

The data showed that the alkaline potassium permanganate method was the best of the three methods tried both in green-house and field experiments in paddy, wheat and bajra, giving significant correlations with per cent responses in all the soils except in red and yellow soils of Ajmer.

The incubation method gave comparatively lower correlation coefficients both in green-house and in the fields. The results were significant only in alluvial soils of Delhi. The Olsen's method did not give significant correlation with per cent responses in any of the soils.

It is also observed that the coefficient of correlation in the green-house were definitely higher than those obtained in the fields. This might possibly be due to many uncontrollable factors such as climatic conditions, soil properties, crop varieties, thickness of stand, cultural practices, insects and diseases—that affect the crop growth in the field. Most of the variable factors can more readily be controlled in green-house experiments than in field studies, which is evident from the results.

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A NEW RECORD OF PLANT FROM CALCUTTA—HOWRAH AREA

WHILE resurveying the weed flora of the Indian Botanic Garden, Sibpore, Howrah, the writers have noticed *Evolvulus alsinoides* Linn., a small diffuse perennial herb of *Convolvulaceae*, growing about the sand stacked near the Central National Herbarium, located inside the Garden. It appears that the seeds of this species were intermixed with sands brought to the Garden for construction work and other purposes. The species has so far been recorded in the dry grassy places of Hooghly District (Prain, 1905) and in all western provinces, but rather rare in Central Bengal (Prain, 1903). There is no mention of the species in Mazumder's (1962)

recent survey of the weed flora of 24-Parganas District.

It also occurs in Bombay Presidency (Dalzell and Gibson, 1861). According to Hooker (1885), it is common throughout India and Ceylon, rare in very dampy regions. This species has also been recorded by Duthie (1911), Cooke (1904), Haines (1922) and Gamble (1923) from the plains of India. The records of the Central National Herbarium indicate, that it occurs in N.W. Frontier of British India, N.W. Himalayas, Punjab, Sind, several places in South India, Assam, Burma, districts of Santal Parganas and Manbhum in Bihar and Hooghly District in Bengal. It is also distributed in the Nicobar Islands.

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HILL REACTION ACTIVITY OF PEPPER FRUIT CHLOROPLASTS

LITTLE is known about the photosynthetic capacity of green fruits apart from the work of Bean and Todd¹ with developing oranges. Recently, however, it was shown from this laboratory² that green pepper fruit could fix carbon dioxide in light leading to the production of a large number of carbon compounds similar to those produced by leaves of the same plant. Confirmation of this finding by isolated

chloroplasts from the fruit with a study of photochemical property of such chloroplasts is reported here. Hill reaction activity of fruit chloroplasts is also compared with that of chloroplasts isolated from leaves.

Pepper plants (*Capsicum annum*, L. cultivar C.A. 452-1) were grown in pots containing manured soil. Green fruits of about 20 days in age and mature leaves from the same plants were detached just prior to experimentation and were cooled for 60 minutes at 0°C. Fruit material (about 15.0 g.) after removal of seed and in the case of leaves about 5.0 g. material after discarding petioles were homogenized in pre-cooled mortars in a medium of following composition: 0.3 M. sucrose; 0.067 M. phosphate to give pH 7.3; 1.8×10^{-3} M. magnesium sulphate and 2×10^{-3} M. versene. The subsequent isolation of chloroplasts from the homogenate by differential centrifugation was made.³ Hill reaction activity of the chloroplast preparations was measured by the method of reduction of 2, 6-dichlorophenol indophenol,⁴ and chlorophyll content estimated.⁵ For the determination of Hill reaction, colorimeter tubes were prepared in the dark with reaction mixture containing sucrose phosphate buffer, 2.0 ml.; 0.1 M. potassium chloride, 1.0 ml.; 0.1% 2, 6-dichlorophenol indophenol, 0.1 ml.; and chloroplast suspension, 0.1 ml. (containing about 0.01 mg. chlorophyll). The tubes were illuminated (2,000 lux) at 15°C. for 3 minutes and the optical density was measured at 620 m μ in a Spectronic-20 photoelectric colorimeter. The results are shown in Table I.

TABLE I

Hill reaction activity of chloroplasts isolated from fruit and leaf of pepper plant as measured by changes in optical density (OD)

Chloroplasts isolated from	Initial OD	Final OD	Decrease in OD	Decrease in OD/mg. chlorophyll
Fruit	0.95	0.80	0.15	12.5
Leaf	0.52	0.41	0.11	10.5

Chloroplasts isolated from fruits exhibited a fairly high activity with respect to Hill reaction. In fact, on unit chlorophyll basis the fruit chloroplasts were more active than those isolated from leaves of same plant. Thus, cells of pepper fruit possess photosynthetic apparatus qualitatively similar to those of leaves and green fruits are capable of photometabolism like the leaves.