

0.01; CaCO_3 , 3.0; agar, 15.0 and glucose, 10.0 and 1 ml of micro-elements.

Organic matter addition at two levels (5 and 10 tons/ha) significantly enhanced the population of *Azotobacter* in a flooded soil (Fig. 1). Moreover, combined application of rice straw at 5 tons/ha with mineral fertilizer further enhanced the *Azotobacter* multiplication. However, combined application of rice straw and mineral fertilizer appeared to be inhibitory when rice straw level was raised to 10 tons/ha.

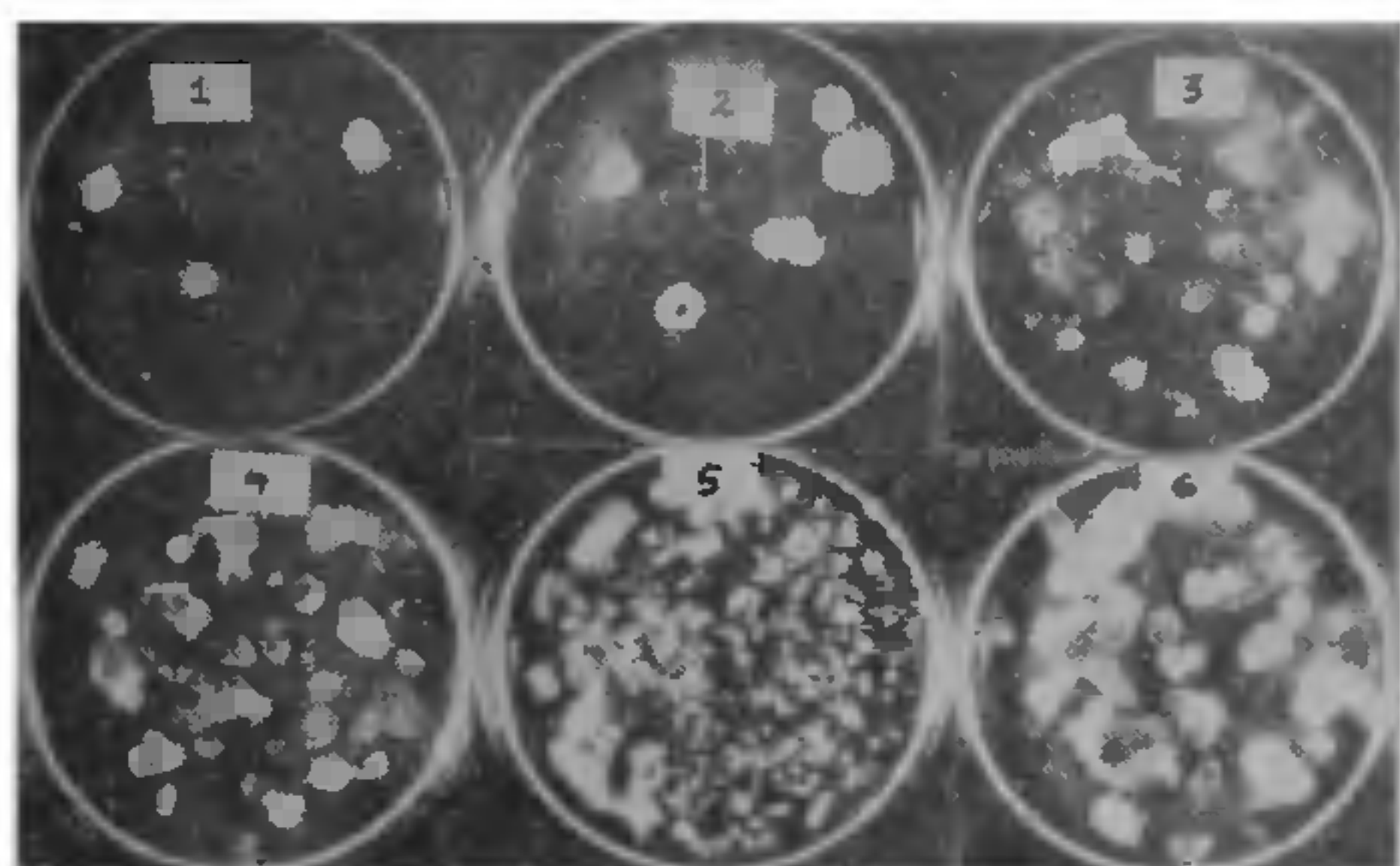


FIG. 1. *Azotobacter* population in flooded soils amended with rice straw and mineral fertilizers. (1) Control, (2) + 100 kg N/ha, (3) rice straw 5 tons/ha, (4) rice straw 5 tons + 100 kg N/ha, (5) rice straw 10 tons/ha, (6) rice straw 10 tons + 100 kg N/ha. (Serial dilution 10^{-8} was used for all soils.)

Independent of the treatment, in all cases, *Azotobacter* was found in greater numbers in the surface layer (0–5 cm) of the flooded soil. The *Azotobacter* population varied from $5-15 \times 10^3$, $15-60 \times 10^3$ and $2-25 \times 10^3 \text{ g}^{-1}$ soil in control, rice straw-amended and mineral fertilizer-treated soils, respectively, during the growing period of rice in the surface soil layer. Individual isolates from different treatments did not differ significantly in their nitrogen-fixing activity (10–12 mg N fixed g^{-1} glucose utilized) as they did in population density.

Azotobacter is found in the oxidized surface layer of a flooded soil and its absence on the roots has been reported⁵. Nitrogen fixation was stimulated when humus compounds were added to medium inoculated with *Azotobacter*³ and also abundant growth of *Azotobacter* occurred in N-poor soils when supplied with rice straw⁴. Recently, Ibrahim² reported that organic manuring has significantly increased *Azotobacter* population and the N_2 -fixation while increasing doses of nitrogenous fertilizer decreased the *Azotobacter* population in a flooded soil¹.

It is clear from the foregoing results that indigenous *Azotobacter* population could be accentua-

ted following judicial amendments with rice straw and mineral fertilizers which would, probably, result in the high fertility status of soil under lowland rice cultivation.

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EFFECT OF PLANOFIX—AN NAA FORMULATION ON GROUNDNUT VAR. TMV 7

THE effect of growth regulators on groundnut yields, have been studied by Narayanan and Gopalakrishnan¹, Narasimha Rao and Gideon² and Wittwer and Sell³. Gopalakrishnan and Srinivasan⁴ reported earlier significant effect of Planofix—an NAA formulation employed as foliar spray in increasing groundnut yield. Not much attention appears to have been bestowed on the effect of Planofix on nodulation and nitrogen fixation. Planofix was applied at 40 and 60 days after sowing groundnut with concentrations, 0, 5, 10, 20, 40, 80 and 160 ppm. against control (no spray). A study of the nodule number, nodule weight as also total nitrogen⁵ and the total carbohydrate⁶ content were made at harvest stage.

Planofix had a beneficial effect and a concentration trend both with a number and weight of nodule, was quite evident (Table I). A concentration of 20 ppm was optimal for maximising nodule number while 40 ppm was optimal for maximising nodule weight. Again, 40 ppm concentration was optimal for maximising total nitrogen and carbohydrate content. With a consequent effect on maximising C/N ratio (Table II), nitrogen content of nodules increased by 31% while carbohydrate content increased by 33%. The exact role of Planofix as an NAA formulation deserves study in depth. That it has

TABLE I

Effect of Planofix on the Nodule Number and Nodule weight (mg/plant) at harvest in Arachis hypogaea (Var. TMV 7)

Treatment—Planofix (ppm)	Nodule Number (per plant)	Nodule Weight (mg)
Control — No spray	57	79.60
Nil — Water spray	59	73.20
— 5	79	110.00
— 10	82	101.00
— 20	95	138.20
— 40	92	142.40
— 80	70	78.00
— 160	65	69.10

TABLE II

The effect of Planofix on the Total Nitrogen (mg/g) and the total carbohydrate (mg/g) content in Arachis hypogaea (Var. TMV 7)

Treatment—Planofix (ppm)	Total Nitrogen (mg/g)	Total carbohydrate (mg/g)	C/N ratio
Control — No spray	20.80	105.00	4.11
Nil — Water spray	23.00	110.00	4.78
— 5	25.80	120.00	4.65
— 10	26.20	129.00	4.92
— 20	26.30	132.00	5.01
— 40	27.20	140.00	5.15
— 80	26.20	125.00	4.77
— 160	25.80	80.00	3.10

its impact on nodulation and nitrogen turnover is an interesting complementary effect.

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CYTOGENETIC BEHAVIOUR OF A FRAGMENT CHROMOSOME IN JOB'S TEARS, *COIX LACRYMA-JOBI* L.

NATURALLY occurring chromosomal abnormalities in Job's tears (*Coix lacryma-jobi* L., $2n = 20$) are scarce¹. In 1966, in selfed progenies of one of the varieties, called *typica* Watt, a single plant having quite normal appearance showed an additional fragment chromosome in tapetal and pollen mother cells. A study of chromosome associations at diakinesis and metaphase I revealed one heteromorphic trivalent and 9 bivalents, as the chromosome fragment paired with two others, in 21 (43.8%) of the 48 cells studied. In all the cells at diakinesis, the trivalent was associated with the nucleolus (Fig. 1). In cells in which 10 bivalents and one univalent were formed, since the univalent-fragment was always found attached to the nucleolus at diakinesis (Fig. 2); it is conceivable that the fragment contained the nucleolus organizing region. Types of trivalents observed were chains and frying-pan, both kinds occurring in about equal proportions. Heteromorphic bivalents involving the fragment and one member of the pair of homologous chromosomes were, however, not observed. Average chiasma frequency per cell worked out to 19.61. At metaphase-I, the fragment either showed precocious movement to the poles or was oriented on the plate along with other bivalents. At anaphase-I and telophase-I, it lagged on the spindle in 23.1% of the 52 cells studied. In 33.3% of the 33 cells examined at telophase-I, it was found staying away at one pole from the rest of the group of normal chromosomes (Fig. 3) indicating that it is frequently eliminated from the daughter nuclei. This is evidenced further from the fact that in 62 (66.0%) of the 94 pollen quartets studied it was found as a micronucleus. Pollen fertility and seed set respectively were 72.4% and 48.7% compared to 84.8% and 62.5% in the normal sibs. The plant with the fragment was maintained through vegetative propagation for several years. In the florets of the new suckers also the fragment was present indicating that it is capable of successfully carrying through mitotic