

CONTRIBUTION OF *DACTYLOCTENIUM AEGYPTIUM* (L.) BEAUV. TO BIORECLAMATION OF SALT-AFFECTED SOIL

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Biological reclamation of salt affected soils involving species adaptation and biological desalination (Swarup, 1980; Singh, 1985) deserves attention in view of its role in minimizing auxiliary input of energy. A laboratory study was, therefore, conducted to understand the significance of inter-relationship between the cover crop [*Dactyloctenium aegyptium* (L.) Beauv.] and the mycoflora of the salt-affected soils and its role in reclamation of these soils.

The experimental site (25°18' N and 83°01' E, 76.19 m above m.s.l.) in Varanasi in the Upper Indo-Gangetic plain was characterized by plenty of greyish-white or fluffy white deposits of salts. The soil of the present study was sandy loam and characterized by the presence of excessive amount of water soluble salts, high pH, E_{Ce}, ESP and SAR values. The organic carbon value was 0.292% whereas nitrogen was 0.035% and C/N ratio was 8.27 in control (Table 1). The area had sparse vegetation, mostly *Dactyloctenium aegyptium* (L.) Beauv., a well known fodder grass that commonly occurs on both normal and salt-affected habitats over the entire expanse of the Indo-Gangetic plains. Where *D. aegyptium* happened to form dominant cover, soil samples were collected up to a depth of 30 cm and taken to laboratory in polythene bags for physico-chemical analysis using standard methods (Piper, 1950; Jackson, 1962).

Fresh leaves of *D. aegyptium* were collected and brought to the laboratory along with the soil samples. The leaves were air dried and powdered material was mixed with the soil (in 1:20 ratio). The mixture was incubated for 100 days with the moisture level maintained at field capacity (15%) by periodic weighing and addition of requisite amounts of sterilized water. Sterilized soil without leaf powder served as control. The experiment was performed in the laboratory under aerobic conditions and the products of decomposition obtained at different intervals were air dried under aseptic conditions and analyzed for physico-chemical attributes.

The litter value reveals that 20 fungi were present during the decomposition process of the substrate : *Cunninghamella echinulata* Thaxter, *Rhizopus nigricans* Ehrenberg, *Absidia butleri* Lender, *Mucor hiemalis* Wehmer, *Chaetomium botrychoides* Zopf, *Aspergillus candidus* Link, *A. flavus* Link, *A. niger* Van Tieghem, *A. nidulans*

Table 1. Effect of *D. aegyptium* leaf decomposition on the mean physico-chemical properties of salt affected soil

Properties	Control	Incubation in days							
		05	10	20	30	50	100		
Sand (%)	70.55	67.50	63.65	63.95	62.80	62.00	61.30		
Silt (%)	15.00	15.64	16.66	16.90	17.75	18.03	18.15		
Clay (%)	14.45	16.86	17.69	19.15	19.45	19.97	20.55		
Water holding capacity (%)	42.20	42.60	48.28	51.36	52.68	51.45	53.45		
pH	10.15	9.45	8.40	8.30	8.10	8.20	8.20		
ECe (mmhos/cm)	6.42	6.20	5.25	5.45	5.15	5.00	4.90		
S A R	64.69	60.74	57.52	54.25	48.37	49.85	48.30		
Organic C (E)	0.292	0.265	0.275	0.260	0.230	0.225	0.202		
N (%)	0.0353	0.0414	0.0624	0.0721	0.0835	0.0834	0.0954		
C/N ratio	8.27	6.40	4.41	3.60	2.75	2.69	2.12		
ESP	48.50	46.90	45.53	44.06	41.21	41.95	41.17		

(Eidam) Winter, *A. ustus* (Bainier) Thom and Church, *Penicillium coryophilum* Dierchx *Fusarium solani* (Martius) Appel & Wollen Weber, *Fusarium semitectum* Berkeley & Ravenel, *Helminthosporium nodulosum* (Berkeley and Curtis), *Alternaria tenuis* Nees, *Curvularia lunata* (Walker) Boedyn, *Trichoderma lignorum* (Tode) Harz, *Cladosporium herbarum* (Persoon) Link, *Phoma hibernica* Grimes, O' Connor and Cumisns and *Pullularia pullulans* (De Bary) Berkhhout.

Clear overall changes took place in the physico-chemical properties of the soil as a result of leaf decomposition (Table 1). Among the textural components, sand fraction lowered as the process of decomposition proceeded, with a simultaneous improvement in their clay fraction. Changes in pH and electrical conductivity contributes to the improvement in soil system, utilization of carbon, release of nitrogen and a concomitant fall in C/N status. Reduction in pH and increase in humus content of the soil were evidently by the production of humic acid during decomposition, rendering the soil less alkaline.

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