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STUDIES ON THE RHIZOSPHERE ALGAE OF *LYCOPERSICON ESCULANTUM* MILL. (TOMATO)

S. N. NANDAN and S. C. BORSE*

P. G. Department of Botany, S.S.V.P.S's L. K. Dr. P. R. Ghogrey Science College, Dhule - 424 005 (M.S.) India.

*S. G. Patil Arts, Science and Commerce College, Sakri - 424 304 Dist. Dhule (M.S.) India.

The present investigation was carried out to study the rhizosphere algae of cultivated vegetable viz. *Lycopersicon esculantum*. The rhizosphere algae were studied at seedling, flowering and fruiting stages. The number of algal taxa were more in rhizosphere soils than non-rhizosphere soil.

Keywords : *Lycopersicon esculantum*; Rhizosphere algae.

The microflora of root soil interface defined as rhizosphere affords a very fascinating field of study. The rhizosphere microflora have been thoroughly investigated in India but the work on rhizosphere algae is very limited in India[1-4].

The present investigation was therefore undertaken to study the rhizosphere algae of *Locopersicon esculantum* commonly grown in Khandesh area. The rhizosphere algae were studied at seedling, flowering and fruiting of tomato plant i.e. *Lycopersicon esculantum* Mill. Algae are known to fix atmospheric nitrogen and also they improve physico-chemical characteristics of soil[5].

The soil samples were collected from the root zone of vegetable crop viz. *Lycopersicon esculantum* Mill. Rhizosphere soil, non rhizosphere soil and surface soil were taken in brown papers and covered with filter papers to avoid contamination by air borne spores. Beneck's medium and Allen and Arnon's[6] medium were prepared for culturing of algae. The algae grown in culture were identified with recent publication and monographs.

The results of physico-chemical analysis of soil are shown in Table 1. The algal taxa which encountered in cultured media of surface and rhizospheres soil of *Lycopersicon esculantum* are shown in Table 2.

In the surface soil of tomato in all 24 algal taxa were recorded. Out of which 20 taxa belong to Cyanophyceae and 4 taxa to Bacillariophyceae (Table 2).

In the non-rhizosphere soil, in all 13 algal taxa were observed. Out of which 10 taxa belong to Cyanophyceae and 3 taxa belong to Bacillariophyceae. In the rhizosphere soil at seedling stage, 14 algal taxa were recorded, out of which 12 taxa belong to Cyanophyceae and two taxa belong to Bacillariophyceae. In the rhizosphere soil at flowering stage, total 21 algal taxa were recorded. Out of which 18 taxa belong to Cyanophyceae and 3 taxa belong to Bacillariophyceae. In the rhizosphere soil at fruiting stage total 9 algal taxa were recorded which included 8 taxa belonging to Cyanophyceae and one taxon to Bacillariophyceae (Table 2).

The physico-chemical parameters of soil have significant effect on the soil flora of algae. pH, available nutrients and moisture content of soil determine the nature and abundance of algal flora in soil. In present study the blue-green algae were dominent in alkaline cultivated soils and they exert a profound beneficial effect on physico-chemical properties of soil as it was supported by Singh[7], Marathe[8] and Subhashini and Kaushik[9].

The total number of algal taxa were more in surface soil than deep non-rhizosphere soils. The occurrence of more algal forms in top layers of soil could be due to alkaline reaction. Similar observations were encountered by Tarar and Giri[4], Murlikrishna *et al.*[10].

Table 1. Physico-chemical analysis of soil.

A) Physical analysis of soil expressed as % on oven dry basis.

	Constituents	Percentage
1	Moisture content	09.70
2	Gravel	04.90
3	Coarse sand	10.00
4	Fine sand	18.00
5	Silt	34.20
6	Clay	23.90

B) Chemical analysis of soil.

	Constituents	Value/quantity
1	Soil pH	7.7
2	Electric conductivity	0.240
3	Organic carbon	0.15%
4	Total nitrogen	0.37%
5	Potassium peroxide	605 kg/hector
6	Phosphorus peroxide	7 kg/hector

Table 2. Algal taxa occurring in the surface, non-rhizosphere & rhizosphere soil of Tomato (*Locopersicon esculantum* Mill).

S. No.	Algal taxa	Surface soil	Non rhizo-sphere soil	Rhizosphere soil		
				Seedling Stage	Flowering Stage	Fruiting Stage
I.	**Cyanophyceae**					
1.	*Chroococcus macrococcus* (Kuetz.) Rabenh.	+	+	+	+	+
2.	*C. tenax* (Kirchn.) Hieron.	+	-	-	+	-
3.	*C. pallidus* Nag.	+	+	-	-	+
4.	*C. limnetics* Lemm.	+	-	+	+	-
5.	*C. indicus* Zeller	+	+	+	+	-
6.	*Aphanocapsa banarensensis* Bharadwaja	+	-	+	+	-
7.	*A. grevillei* (Hoss) Rabenh.	-	-	+	-	+
8.	*Oscillatoria chlorina* Kuetz. ex Gomont	+	+	+	+	-
9.	*O. chalybea* (Mortons) Gomont	+	-	-	+	-
10.	*O. tenuis* Ag. ex Gomont	+	-	+	+	+
11.	*O. raoi* De Toni J.	+	+	-	-	-
12.	*O. irrgua* (Kuetz.) gomont	-	+	-	+	+
13.	*O. formosa* Bory ex Gomont	+	+	+	+	-
14.	*O. lecmermamii* Wolosz.	+	-	-	-	-
15.	*O. acuminata* Gomont	+	+	+	+	-
16.	*Phormidium fragile* (Maneg.) Gomont	+	-	+	+	+
17.	*P. laminosum* Gomont	+	-	+	+	-
18.	*P. autumnale* (Ag) Gomont	+	-	-	+	-
19.	*Lyngbya perelegans* Lemm.	+	+	-	+	-
20.	*L. semiplena* (C.Ag.) J.Ag.ex Gomont	+	-	-	+	-
21.	*L. acrugineo-coerulae* (Kuetz.) Gomont	+	-	+	+	+
22.	*L. martensiana Manegh.* ex Gomont	+	+	-	+	+
II.	**Bacillariophyceae**					
23.	*Fragilleria intermedia* Grun.	+	-	+	+	-
24.	*Coloneis baccariana* Grun	+	+	-	-	+
25.	*Navicula cryptocephalis* Kuetz. var. *subsalina* Hustedt	-	+	-	+	+
26.	*N. radosa* Kuetz. var. *minutissima* (Grun.) Cleve	+	+	-	+	-
27.	*Pinnularia interrepta* W. Smith	+	-	+	-	-

(+ : Present, - : Absent)

In present study the number of algal forms observed were more in rhizosphere soils than non-rhizosphere soils. This might be due to the fact that root surface furnished good conditions for the growth and development of algae as agreed with views of earlier workers[11].

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