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AZOTOBACTER ISOLATES IN THE PHYLLOSPHERE OF CROPS GROWN IN SEWAGE IRRIGATED FIELDS

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ABSTRACT
It is known that microorganisms in sewage or sewage irrigated soils are actually very few on the plant surface. Many species are known of which few are cattle and human pathogens. Growing the plants in sludge treated soils where found in less numbers. It was seen that *Azotobacter* is one of the most important non–symbiotic Nitrogen fixing bacterium increases the fertility of soils. Presence of *Azotobacter* on the phyllospere of eight crops irrigated with sewage was studied. There was a quite a large variation in the population of *Azotobacter* on the phyllospere of different crop plants .Higher number of *Azotobacter* was noted on phyllospere of Tomato, groundnut, Brinjal followed by chili, coriander, methi, cotton and dilpasand. Variation was also recorded among the different seasons, during rainy season their number was maximum on tomato, during winter their number was maximum on brinjal. During summer number of Azotobacter appeared to be less when compared with other seasons.

KEY WORDS: *Azotobacter*, phyllospere, Sewage irrigated fields.

INTRODUCTION
It is very well known that surfaces of higher plants growing under natural condition with a large and varied population. This area is known as phyllosphere microorganisms play an important role to fix atmospheric nitrogen (Ruinen, 1965). Control the incidence of plant diseases by producing antibiotics (Lamb and Brown, 1976), produce auxins (Buckley and Pugh, 1971) and decompose organic matter (last and Dieghton, 1965). In the present investigation *Azotobacter* on the phyllosphere of eight crops irrigated with municipal sewage was studied. There was large variation in the population of *Azotobacter* of different plants. Seasonal variation was also recorded. The maximum number was seen on the phylloplane of tomato, groundnut and brinjal. These are supported by the work of Shinde (2002) who also reported the presence of *Azotobacter* on the phyllosphere of tomato. Some isolates were more effective for improvement of crop yield. Temperature, humidity and rainfall alongwith some other factors of the host might be responsible for seasonal variation (Di menna, 1971) and variation in the population of *Azotobacter* on the population of different crops might be attributed to the structure of epidermis, cuticles trichomes and biochemical nature of the leaves of various crop plants. Rain splash or sewage irrigation might have transmitted *Azotobacter* from soil to the leaf surface of different plants (Gangawane, 1972).

MATERIALS AND METHODS
Presence of *Azotobacter* population, if any, on the green leaves surface (Phyllosphere) was studied. This was done as per the method described by Last (1955) and Ruinen (1965). Samples of green leaves were randomly collected in the sterile polythene bags and brought into laboratory. In general, samples of green mature leaf at 6" from the base of soil were collected. One gram of the leaves was added in 100ml of sterile distilled water in 250 ml Erlenmeyer conical flask. The flask was placed on rotary shaker for 30 minutes. One ml of suspension from this flask was plated along with 20 ml melted nitrogen free glucose medium. The plates were incubated at 30^{o}C for 72 hrs and number of *Azotobacter* / gm of leaves samples was confirmed.

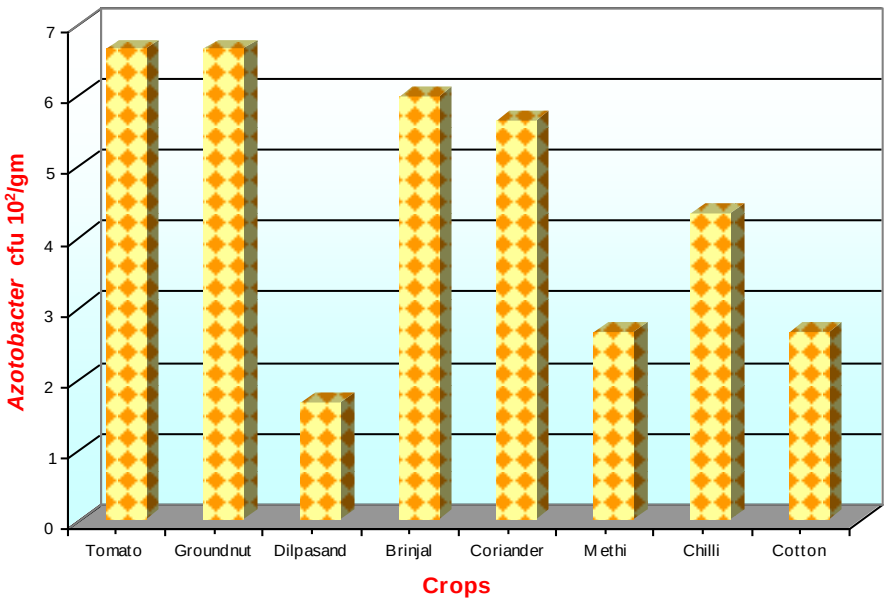
RESULTS AND DISCUSSION
Presence of *Azotobacter* on the phyllosphere of different crops irrigated with sewage was studied. A total of 8 crop plants were screened for three seasons and the results are presented in table 1, fig. 1. There was quite a large variation in the population of *Azotobacter* on the phyllosphere of different plants. Variation was also recorded among the different seasons, during rainy season their number was maximum on tomato, during winter their number was maximum on brinjal. During summer the number of *Azotobacter* appeared to be less when compared with other

seasons. When the average was calculated the maximum number was seen on the phyllosphere of tomato, groundnut and brinjal. The range was from 1.66 cfu 10^2/gm to 6.66 cfu 10^2/gm.

Table 1: Presence of *Azotobacter* (Cfu / 10^2 / gm) on the phyllosphere of crop plants grown in sewage irrigated soils at Aurangabad during different seasons

Crop	Rainy	Winter	Summer	Average of three seasons
Tomato (*Lycopersicon esculentun* Mill)				
	10.00	08.00	02.00	06.66
Groundnut (*Arachis hypogea* L.)				
	06.00	09.00	05.00	06.66
Dilpasand (*Citrullus fistulosus* Stocks.)				
	03.00	02.00	00.00	01.66
Brinjal (*Solanum melongena* Linn.)				
	07.00	05.00	06.00	06.00
Coriander *(Coriandrum sativum* Linn.)				
	05.00	10.00	02.00	05.66
Methi (Funegreek) (*Trigonella foenum graccum* L.)				
	02.00	06.00	00.00	02.66
Chilli (*Capsicum annurumm* L.)				
	09.00	03.00	01.00	04.33
Cotton (*Gossipyium herbacum* L.)				
	03.00	05.00	00.00	02.66

Fig. 1: Presence of *Azotobacter* isolates (cfu 10^2/gm) on the phyllosphere of crop plants grown in sewage irrigated soil (average of three seasons)



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