

CHAPTER IV

**SUMMARY AND
CONCLUSIONS**

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Genus Phaseolus is widely known as pulse crop distributed all over the world for food, oil and forage. They provide 20% food diet to the world. The Phaseolus aureus roxb. (mung) is cultivated in Maharashtra in few districts. Maharashtra stands first in acreage and production.

This legume crop is self pollinated and annual one. It has busy habit and is cultivated as kharip crop during June and July along the cereal crops and harvested after 3 months. The Physical and chemical nature of soil plays an important role in plant growth and yield. Seeds germinate in cold soils and warm and moist climate. The optimum pH requirement for this crop for maximum yield is between 5.5 to 6.0, clean, shallow cultivation with efficient weed and disease control gives better yield.

It is wellknown to man for centuries that salinity has deleterious effects on crop growth.

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salinity affects the mineral absorption which induces abnormalities in the plant metabolism and this also affects growth and yield adversely. In Maharashtra about 3-4 lakh hact^ors of land became saline due to heavy use of chemical fertilizers over irrigation and poor drainage. a

Although overall growth retardation due to salinity is well established, a systematic analysis of various growth parameters under saline conditions, is performed by few workers only. Therefore, with this view attempts have been made to study some aspects regarding organic and inorganic status of mature and senescent leaves of two varieties of P. aureus local and pusa vaishakhi. The effect of NaCl on some organic constituents like chlorophylls, carotenoids, TAN and polyphenols were studied. The changes in physical properties of leaves, R.W.C., density as well as inorganic constituents like Na, K, Ca, Mg, Fe, Cu, Mn, Zn, chlorides etc. are also studied in present investigation in two P. aureus varieties local and pusa vaishakhi. have

The significant findings recorded under salt stress studies are as follows :

- (1) The plant growth with respect to average plant height. The shoot length decreased in both varieties of P. aureus as a result of NaCl treatment. The root length is decreased so that the shoot/root ratio is declined. The results are prominent in the pusa vaishakhi variety indicating the salt tolerant nature.
- (2) The leaf area decrease with higher concⁿ of NaCl which decrease the photosynthetic area.
- (3) The leaf moisture content increases over control which brings about the dilution effect. The senescent leaves of both varieties shows more moisture and succulence over green. The results in the senescent leaves of Had treated pusa vaishakhi variety are more significant over local NaCl treated variety.

- (4) The average leaf weight, leaf thickness and leaf volume increased in senescent leaves while leaf area and density decreased. The decrease in density is due to increased leaf volume.
- (5) Both the varieties show higher values of TAN in senescent leaves than green ones. The pusa vaishakhi var. shows more TAN values.
- (6) The polyphenols are increased in leaves as a result of NaCl treatment in both varieties over control. The pusa vaishakhi shows lower values of polyphenols than local variety.
- (7) The photosynthetic pigments are gradually declined during senescence. The chlorophyll degradation is significant in local variety as compared to pusa vaishakhi during senescence. The increasing salinity of NaCl enhances the degradation of chlorophylls. N
- (8) The carotenoids is increased in senescent leaves over green. The increase in carotenoid

is significant in local variety than the pusa vaishakhi indicating pusa vaishakhi a salt tolerant nature.

(9) The inorganic constituents in the leaves of two P. aureus varieties show different behaviours under NaCl treatment.

i) Sodium content increases at higher concⁿ of NaCl in both varieties while Na/K ratio decreases with progressive increase in NaCl in both varieties i.e. salt sensitive nature.

ii) The local variety is more sensitive to NaCl treatment than pusa vaishakhi. There is significant withdrawal of K from the senescent lvs. of NaCl treated plants K is an essential element and required in young developing plant parts, hence its withdrawal from senescent leaves is suggesting its maximum and economical utilization in the plant metabolic process.

- iii) Calcium values are higher in senescent leaves than green leaves of both varieties of P. aureus under NaCl treatment. However, Ca accumulation is significant in Pusa vaishakhi. Increased Ca is helpful to increase the salt tolerance.
- iv) Due to NaCl treatment Ca content increases which inhibit Mg absorption and hence Mg values are reduced in both green and senescent leaves of both the varieties of P. aureus.
- v) There is little reduction in Fe content in senescent leaves of both the varieties P. aureus. However, Fe content increases in both green and senescent leaves of both the varieties with progressive increase in NaCl concⁿ.
- vi) There is no significant change in Mn content in green as well as senescent lvs. of both varieties. In both varieties

Mn values in green and senescent leaves are remained almost unchanged even under NaCl treatment.

vii) Both varieties show decrease in Cu content in green and senescent leaves. This decrease in Cu content is progressive as the concⁿ of NaCl increased.

viii) Zn content is also reduced in senescent leaves progressively with increasing concⁿ of NaCl in both the varieties.

xi) NaCl treatment show accumulation of chlorides in both green and senescent leaves of both varieties of P. aureus. The chloride accumulation is increased as the NaCl concⁿ increased in the treatment. This greater accumulation of chlorides causes the toxic effect on plant resulting into retardation of growth.