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RELATIONSHIP OF PLANT AND SOIL IN RESPECT OF EXCHANGEBLE CALCIUM POTASSIOM AND SODIUM IN SOME SPECIES OF FAMILY ACANTHACEAE

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ABSTRACT:- Soil plant analysis show the linking of Peristrophe bicalyculata to calcium rich soil than that of Adhotoda vasica at Rewa a belt of calcium passes through civil lines area where this P bicalyculata is available in plants where as A.vasica is not at all available in that area P. bicalyculata absorb K and Na leaser than that of Ca.

KEYWORDS:-Soil, Plant analysis.

INTRODUCTION:-

Various experimental approaches have been made to understand the relationship between plant and environments plant and soil, plant and minerals. In addition to habitat study (Daubenmire 1947), Pandey (1969) and community study. Coltom *et all* 1953 Coltom and Curtico 1956 Oosting 1958, Hanson, Churchill 1961. And Narman(1957) Various experimental approaches have been made to understand .the relationship between plant and soil (Hewitt 1952) found sand and water culture methods as most useful tool. Turesion (1922a-1922b) studied genetic variation within species and the interaction of these variations to the habitate condidtion. Which is now recognized as "Genecology" Heslop and Harrison (1964). Concept of growth analysis of different plant part to understand the impact of environment of plant growth has been comphasized by several investigators including Higgs and Jemes (1969)and Leith (1968) found mineral cycling between the plant and environment to be of basic importance In present study plant *Peristrophe* and *Adhatoda* of family Acanthaceae found in tropical countries *Adhatoda vasica* is highly valued for its medicinal properties as an expectorant where as *Peristrophe bicalyculata* is a medicinal ornamental and decorative plant.

MATERIAL AND METHODS:

Determination of exchangeable Na, K and Ca in soil: A 11 gm of field moist soil (equalivent to 10 mg air dry soil) was weight out into a 100ml conical flask and 25 ml 1N NH4Oac was added. The flask was stoppard and shaked for 10 minutes and than allowed to stand overnight. The content of the flask was than transfered to a centrifuge tube and centrifuged. The clear solution was transfered to 100 ml volumetric flask through a funnel with moist whatman no. 42 filter paper. The process repeated three times. The solution was made up to 100 adding NH4Oac. A standard of 0.5,10,15,50,100 ppm were prepared from the stock solution from the emission value of these standard solution determined by flame photometer. A calibration curve was constructed. The emission value of the test solution was determined by flame photometer. The amount of Na, K and Ca were determined with the help of calibration curve.

Determination of Na and K in the Leaf: A 0.5 gm sample of ground and dried *Peristrophe bicalyculata* and *Adhatoda vasica* leaf was weight and transferred into 100 ml conical flask and 25 ml of 2N NH4 Oac (pH-7) was added and shacked for 15 minutes and allowed to stand 1 hours. The content of flask was thus transferred to centrifuge tube and centrifuged. The clear solution was transfered to a 100 ml volumetric flask through a funnel with moist whatman No 42 filter paper. This process repeated three time. A standard solution 0.5,10,15……...50 ppm were prepared from the stock solution (By flame photometer). From the emission value of these standard solution determined by flame photometer a calibration curve was constructed. The emission value of the test solution was determined by flame photometer. The amount of Na and K were determined with the help of calibration curve.

Determination of Ca in Leaf: A 100 mg leaf was dissolved in 0.4 N HCL and this was mad into 100 ml. A standard solution of 0.5,10,15…….50 ppm were prepared from the stock solution from the emission value of the standard solution determined by flame photometer a calibration curve was constructed. The emission of the

test solution was determined with the help of calibration curve.

RESULT AND DISCUSSION : In present study the soil of four different location were collected form there leaves and soil were analyzed for calcium, sodium and potassium. In the same way plant leaves of four different location of Rewa (M.P.) were also analyzed and result were tabulated in the Table : 1,2 and 3.

Table 1 :- Soil analysis of different localities of *P. bicalyculata.* (Value in %)

Sr.No.	Name of different Localities	pH	Exchangeable Sodium	Exchangeable Potassium	Exchangeable Calcium
1.	Civil Lines				
I	Top soil	6.8	0.0160	0.0042	0.0362
II	Middle soil	6.8	0.0135	0.0030	0.0393
III	Lower soil	6.7	0.0126	0.0016	0.0525
2.	A.G. College				
I	Top soil	6.9	0.0157	0.0067	0.0281
II	Middle soil	6.8	0.0150	0.0063	0.0443
III	Lower soil	6.8	0.0146	0.0045	0.0512

Table 2 :- Soil analysis of different Localities *A. vasica* (value in %)

Sr. No.	Name of different Localities	pH	Exchangeable Sodium	Exchangeable Potassium	Exchangeable Calcium
3.	Bichhiya				
I	Top soil	7.0	0.0102	0.0128	0.0362
II	Middle soil	6.9	0.0091	0.0085	0.0393
III	Lower soil	6.9	0.0075	0.0078	0.0525
4.	Uprahati				
I	Top soil	6.9	0.0106	0.0112	0.0281
II	Middle soil	6.9	0.0100	0.0075	0.0443
III	Lower soil	6.8	0.0093	0.0057	0.0512

Table 3:- Plant leaves analysis of *P. bicalyculata* (Nees) and *A. vasica* (Nees)

Sr. No.	Name of different Localities and species	Exchangeable Sodium	Exchangeable Potassium	Exchangeable Calcium
A.	*P. bicalyculata*			
1.	Civil Lines	0.0086	0.0760	0.0656
2.	A.G. College	0.0065	0.0737	0.0818
B.	*A. vasica*			
C.	Bichhiya	0.0040	0.0902	0.0731
4.	Uprahati	0.0052	0.0875	0.0712

Soil exerts its profound influence on the growth performance of the plant. Besides getting a food hold in the soil plant also got nourishment in the form of mineral and water from it due to this close intimacy of plant and soil strongly influence each other (Daubenmire 1959) for healthy growth of plant. Soil exerts its influence through various adaphic component such as texture mineral composition, water holding capacity, PH, organic matter exchangeable bases and there basic ratio etc. studies on soil plant relationship have been made by many investigators (Palaippan) and Woon (1973) Chatterjii (1975), Shukla (1977), Sharma (1988), Khare (1987), Michal (1990), Verma (1992).

Present study indicates that soil is rich with Calcium in all the localities of the two plants and the plant require Calcium for formation of wall and middle lamella, plant has also appreciable amount of Calcium. Amount of Calcium almost equal with very slight variation in P. bicalyculata and A. vasica. The percentage of Sodium and Potassium is less than that of Ca in the soil of all the localities of P. bicalyculata and A. vasica but both the sp. show slight higher percentage of there exchangeable base in there tissue. That indicate that plant do not depend totally on the exchangeable base of soil but they do require there presence but deficiency of these also cause different diseases. So the study reveals that plant have higher percentage of exchangeable bases Na, K, and Ca than that of soil.

Among basis plant is having higher percentage of Potassium, Calcium and Sodium, Potassium is essential element for synthesis of enzyme and there function its presence is essential for metabolic activity. Whereas Calcium which form wall lamella, next in percentage is Sodium which is micro element of the minerals is required is very little amount and its presence is also minimum in plant tissue. This confirms the early work on soil and plant analysis.

Soil plant analysis show the linking of P. bicalyculata to Calcium rich soil than that of A. vasica at Rewa a belt of Calcium posses through civil line area were this P. bicalyculata is available in plenty where as a A.vasica is not at all available in that area plant absorb Potassium and Sodium.

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