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Change in mineral content in *Lathyrus sativus* infected with *Peronospora lathyri-palustris*

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ABSTRACT : Nitrogen was found to be deficient in diseased leaflets on the tenth day after appearance of the symptom. Phosphorus, potassium, and calcium remained unchanged in diseased and healthy leaflets. Zinc, manganese and copper became gradually less in the former in contrast to the latter in which the trend was reversed. Iron was found to be gradually increasing in diseased leaflets while decreasing in healthy ones.

Keywords : *Lathyrus sativus*, downy mildew, mineral content

Minerals play significant role in the biochemistry and physiology of plants (Clarkson and Hanson, 1980) but the report of alteration in their level due to disease is scanty (Gupta, 1975; Luthura *et al.,* 1988b). The present paper deals with determination of some mineral content in *Lathyrus sativus* L. due to *Peronospora lathyri-palustris* Gaum, the incitant of downy mildew disease.

MATERIALS AND METHODS

Ten plants of local variety of *Lathyrus* were raised each in garden soil filled in six earthen pots each having 25 cm top diameter, 15 cm base diameter and 25 cm depth in the first week of November 1994. These were watered weekly. After two months of growth, the plants of three pots were inoculated maintaining control of un-inoculated plants of remaining three pots. Slightly modifying the methods of Lal (1984) who used very dilute aqueous Tween 80 and 40×10^3 sporangia/ml, their number was adjusted to 5×10^2/ml of 0.5% Tween 20 solution in sterilized conductivity water after taking them from heavily infected leaflets of the same variety of plants. The pots were maintained under humid chamber made of black opaque polythene sheet supported by aluminium frame at 20°C for 48 h. The pots wee transferred to diffused light still maintaining the same humidity at 25°C for 3 days and then to a corner of a humid garden. The estimation of minerals was made three times at an interval of 10 days after appearance of the symptom of disease on the 11th day of inoculation.

Ten grams of infected and healthy leaflets nearly of the same age were taken separately in petri dishes and dried at 60° for 36 h, and desiccated over fused calcium chloride for next 72 h. The leaflet samples were powdered in separate clay mortars for healthy and diseased samples. Phosphorus (P) was estimated by vandomolydate yellow colour method in HNO_3 after digesting 0.5 g

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Table 1. Quantitative value of mineral content in the leaflets of *Lathyrus sativus* due to downy mildew disease

Mineral content	Diseased leaflet (day of observation)			Healthy leaflet (day of observation)		
	10th	20th	30th	10th	20th	30th
*N	3.3	3.2	3.2	3.3	3.3	3.3
P	0.0	0.0	0.0	0.0	0.0	0.0
K	0.4	0.4	0.4	0.4	0.4	0.4
Ca	0.4	0.4	0.4	0.4	0.4	0.4
**Zn	45	43	42	49	50	50
Fe	623	625	628	565	564	562
Mn	76	74	71	80	81	81
Cu	55	54	53	74	75	76

* = % value, ** = ppm value

of powder in triacid, i.e., HNO_3 :$HCLO_4$: H_2SO_4 (10:4:1). Potassium(K), and calcium (Ca) were estimated by flame photometer (Jackson, 1973). Zinc (Zn), iron (Fe), manganese (Mn) and copper (Cu) were estimate with the help of atomic absorption spectrophotometer Model AA 575. Nitrogen (N) was estimated with Coleman N_2 analyzer (Prasad *et al.,* 1989).

RESULTS AND DISCUSSION

It seems (Table 1) that the quantity of P, K and Ca remains unchanged in healthy and diseased leaflets pointing out normal absorption and subsequent translocation of these cations besides, expectedly, their inappreciable loss due to infection. There appeared very slight gradual decrease in Zn, Mn and Cu. Contrary to these, Fe was found to be gradually accumulated in diseased leaflets while decreasing in healthy ones. Similar observation has been made for N, P, Zn, Mn and Fe in groundnut leaflets due to leaf spot pathogens (Gupta *et al.,* 1992). Alteration in mineral content has earlier been reported in mustard due to *Alternaria* leaf blight and has been interpreted in terms of disease resistance and susceptibility (Gupta *et al.,* 1984).

Quantitative decrease in N might be due to attenuated activity of nitrate reductase and urease and enhanced activity of oxiative and non-oxidative deaminase with release of ammonia as observed in coriander due to stem gall (Prasad *et al.,* 1989). Decrease in N and other minerals might also be due to loss as root exudate reported earlier in mustard seedlings raised from the seeds stored with *Aspergillus flavus* (Kishor *et al.,* 1990) or hindered absorption of solute and subsequent translocation. Accumulation of Fe might result due to complex formation in diseased leaflets (Agrios, 1973) and its retention there.

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