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CHANGES IN THE NITROGEN AND SUGAR CONTENT OF RICE INFECTED WITH *CORTICIUM SASAKII* (SHIRAI) MATSUMOTO

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Infection by the pathogen and its spread in the host are accompanied by certain changes in the biochemical processes and these have been reported by various workers (Mccombs and Winstead, 1964; Ghosh *et al*. 1964; Ram Dayal and Joshi, 1963). The present study was undertaken to determine the changes in nitrogen and sugar content of rice infected by *Corticium sasakii* (Shirai) Matsumoto.

Materials and Methods

The pathogen *(C. sasakii),* was isolated from infected rice and maintained on potato dextrose agar medium after purification by the hyphal tip method. *Annapurna,* a highly susceptible variety of rice, was used for the studies and the seedlings were grown in 25 cm pots. At the tillering phase, the plants were inoculated with sclerotia from 15 day old culture of the fungus and the inoculated plants were kept under humid conditions for 48 hours. Control plants were kept without inoculation Four samples were collected at intervals of two days from control and inoculated lots, for the determination of nitrogen and sugar content. Total nitrogen was estimated by the micro kjeldahl method (Piper, 1S66) and expressed as percentage of nitrogen on dry weight basis. Amino nitrogen was estimated by the colorimetric method described by Jacobs (1956) and expressed in glycine equivalent (mg/g fresh weight of leaf). The sugar content was determined by the anthrone method and expressed as percentage glucose on dry weight basis (Yem, and Willis, 1954).

Results and Discussion

The changes in the total nitrogen in rice as a result of infection by *Corticium sasakii* are given in Table 1. The data reveals that there is a progressive reduction in nitrogen content as infection progressed, whereas in healthy plants it increased as the age of the plant advanced. The difference in the nitrogen content of healthy and inoculated plants was significant during the last three sampling periods.

It is evident that the healthy and infected plants showed a steady increase in the total amino nitrogen content, but this was significantly higher in the infected plants at all stages.

Table I

Changes in the nitrogen and sugar content of rice infected with *C. Sasakii*

Sampling interval after inoculation (days)	Total nitrogen		Total amino acid		Total sugar	
	Healthy	Infected	Healthy	Infected	Healthy	Infected
2	2.226	1.933	6.410	7.500	0.492	0.267
4	2.426	1.900	7.330	9.660	0.725	0.498
6	2.535	1.800	7.430	11.830	0.830	0.677
8	2.680	1.500	9.250	12.632	0.996	0.871
Mean	2.470	1.780	7.605	10.380	0.773	0.578
C D for marginal means.		0.276		0.104		0.075
C D for combinations		0.552		0.207		0,,149

It is also clear from the Table that the total sugar content of healthy plants varies from 0.492-0.996, whereas in infected plants it varies from 0.268-0.871. At all stages, the infected plants recorded a significantly lower sugar content as compared to healthy plants.

It is well known that plant pathogens vary in their nutritional requirements and consequently differ in their pathogenic behaviour. In a susceptible host, infection by a virulent pathogen brings about certain biochemical changes which are reflected in the form of general and specific disease symptoms. These biochemical derangements affect certain constituents of the host, which are often quantitative.

In the present study, the percentage of total nitrogen was low in inoculated rice plants. Similar results have been reported by Coons and Klotz (1925) in Celery plants infected by *Cercospora apii* and *Septoria apii* and by Asada (1957) in rice plants infected by *Helminthosporium* sp. The reduction in total nitrogen indicated its utilisation by the pathogen (Asada, 1957).

The amino nitrogen content of inoculated plants showed an increase over the control as in the case of cucumber infected by *Pythium aphanidermatum* (McCombs and Winstead, 1964) and blue-berry infected by *Glomerella cinguiata* (Stretch and Cappellini, 1965).

The increase in amino nitrogen can be accounted due to the proteolysis of host protein catalysed by normal host or fungus enzymes or synthesis of amino acids by the fungus (McCombs and Winstead, 1964). However, there are reports of reduction of amino nitrogen content after infection by fungi indicating its utilisation by the pathogen. Hence, it is difficult to interpret the changes of amino nitrogen in infected tissues.

The total sugar content showed a decline in rice plants after infection by *C. sasakii.* Similar results were reported by Dayal and Joshi (1960) in barley infected by *Ramuleria areo/a.*

There was a close relationship between the development of disease and reduction of sugar content. The decline in total sugar content may be due to its transformation and its utilisation for the growth of the pathogen. Samborski and Shaw (1956) suggested that increased respiration due to infection may be responsible for the reduction in total sugar.

Summary

Changes in the nitrogen and sugar content of rice plants after infection by *Corticium sasakii* (Shirai) Matsumoto were investigated. The infection by the fungus reduced the total nitrogen content. The amino nitrogen content increased

significantly due to infection. The sugar content also showed significant reduction as compared to healthy plants.

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സംഗ്രഹം

നെല്ലിൽ ഷീത്ത് ബ്ലൈറ്റ് (പോളരോഗം) ഉണ്ടാക്കുന്ന *കോർട്ടീസിയം സസാക്കി* എന്ന കുമിളിന്റെ ആക്രമണത്തെതുടർന്ന് രോഗം ബാധിച്ച നെൽച്ചെടികളിൽ പാകൃജനകത്തിന്റെ തോത് കുറയുന്നതായി കണ്ടു. എന്നാൽ ഇവയിൽ അമിനോ പാകൃജനകത്തിന്റെ തോത് കൂടുതലായിരുന്നു. രോഗബാധിതമായ ചെടികളിൽ പഞ്ചസാരയുടെ അളവും ഗണ്യമായി കുറയുന്നതായിട്ടാണ് കാണുവാൻ സാധിച്ചത്.

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