

This reduction was 74% in the stem, 55% in the leaf and 54% in inflorescence, which was highly significant.

TABLE II
Energy content in cal/g ash free dry matter

Plant part	Healthy	Infected	Signi- ficar ce level
Stem	3183	2383	5%
Leaf	3655	2011	5%
Inflorescence	4915	2782	1%

Thus the overall ecopathological effects of smut of *Isellema* grass reveal reduction in the rate of photosynthesis and lower energy status of host plant parts. However, these metabolic losses occurred without

any significant changes in the morphology of the host.

Our sincere thanks are due to Prof. L. P. Mall for providing necessary facilities for the work.

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SHORT SCIENTIFIC NOTES

Antifungal Activity of Some C₂₈ Steroidal Lactones

Withanolides¹ and physalins², a new group of C₂₈ steroidal lactones from family Solanaceae have been found to possess anti-tumour, anti-inflammatory and antibacterial activity³. In continuation of our work on the antifungal activity of Withaferin A⁴, we now report on the activity of other related compounds with different substitution patterns to establish the structure-activity relationship.

The compounds* (Withaferin A, Withanolide E, Withanicandrin, and Physalin B) dissolved in ethanol were incorporated in Czepek's agar medium to obtain different concentrations and the antifungal activity of the compounds was seen against *Aspergillus flavus*, *Epidermophyton floccosum*, and *Cladosporium herbarum*.

Withaferin A inhibited the growth of fungi in concentrations varying from 250 to 500 µg/ml whereas other compounds were inactive at concentrations of even 1 mg/ml.

The presence of 4 β-OH; 27-OH; 17 β side-chain; 5 β, 6 β-epoxide, as seen in Withaferin A, seems to be significant for the biological activity. Withanolide E lacks 4 β-OH, 27-OH and has 17 α-sidechain, whereas, Withanicandrin has 5 α-OH, 6 α-, 7 α-epoxide, both these compounds being inactive. It is interesting to observe that physalins are almost biologically inactive possibly due to their highly oxygenated nature.

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- * Withaferin, A (4 β, 27-dihydroxy-5 β, 6 β-epoxy-1-oxo-22 R-witha-2, 24-dienolide);
Withanolide E (14 α, 17 α, 20 α-trihydroxy-5 β, 6 β-epoxy-1-oxo-17 S, 20 S-22 R-witha-2, 24-dienolide);
Withanicandrin (5 α-hydroxy-1, 12-dioxo-6 α, 7 α-epoxy-22 R-witha-2, 24-dienolide);
Physalin B (22 R-14 α, 17-14 β, 26-diepoxy-13, 20, 22-trihydroxy-1, 15-dioxo-16 α, 24-cyclo-13, 14-seco ergosta-2, 5-diene-18, 27-dioic acid, 18→20, 27→22 dilactone).

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Screening for Genetic Host Resistance Against the Bacterial Leaf Spot Disease in Tomato Incited by *Xanthomonas vesicatoria* (Doidge) Dowson*

Bacterial leaf spot disease in tomato incited by *Xanthomonas vesicatoria* is not so very serious in India at present. Field observations have, however, revealed that the disease can occasionally flare up in epiphytotic proportions. Locating genetic resistance and breeding resistant varieties will be the most effective method of controlling this disease. Alexander and Lincoln (1942) reported *Lycopersicon peruvianum* Linn. to be the most valuable source of resistance in tomato against the disease. Avezdezhnova (1967) detected varietal differences

in the intensity of the disease though no variety was found to be entirely resistant. Information on varietal resistance to the disease being not available in the country, studies were carried out on these aspects at the Indian Agricultural Research Institute, New Delhi, during the period 1968-1970.

Eight hundred and forty germplasm lines of tomato belonging to the EC (Exotic Collection) and IC (Indigenous Collection) series were obtained from the plant Introduction Division of the IARI and these were screened for resistance.

Five seedlings of each line were raised in earthen pots 30 cm size and the plants were inoculated at the flowering stage by spraying the bacterial suspension obtained from a culture aged 24 hours with OD around 0.70-0.87 at 610 m μ . A rocker sprayer was used for inoculative application of the suspension. High humidity was maintained by spraying water on the plants at regular intervals. Observations on the reaction of each line was recorded after a period of two weeks. The severity of leaf and stem infection, extent of yellowing and defoliation were all taken into consideration for rating the lines into the various categories of resistance.

Of the 840 lines tested, none was found to have any absolute genetic resistance. The lines rated in the category 'slightly diseased' were as follows:

EC Lines: EC 1143, 2699, 2751, 2804, 3218, 4532, 5632, 6050, 6591, 7919, 8259, 8286, 8741, 9412, 12489, 12491, 16059, 16271, 16278, 16290, 17168, 21606, 26318, 27900, 31820, 35237, 35250, 35274, 35282, 37274, 37301 and 42663.

IC Lines: IC 6486 P2, 6504 Pl, 13940 A, 16060 Pl.

The authors are grateful to the Head of the Division of Mycology and Plant Pathology, IARI, New Delhi-12, for the facilities provided for these studies.

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* Part of the theses submitted by the senior author to the Post-Graduate School, IARI, New Delhi, in part fulfilment of the M.Sc. and Ph.D. degree programmes.

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Barite Mineralization Near Village Khairasian, Dist. Pauri, Garhwal, U.P.

A promising zone of barite occurrence has recently come to light, on the hill-slope, about half a km south-west of Khairasain (78° 44' 30" E : 29° 53' 20" N), located five km south-east of Satpuli (78° 42' 45" E : 29° 55' N) on the left bank of Eastern Nayar river. Garhwal Dist., U.P. The mineralized zone is associated with the lowest quartzite member of the Nagthat Formation near its contact with the underlying greenish grey phyllites of Chandpur Formation. A barite band varying in thickness from 1 to 1.5 m occurs conformably overlying the associated quartzite and phyllite which have a regional NW-SE strike with 50°-55° southwesterly dips. The continuity of barite along the strike has been traced for over 1/2 km. towards the north-east of Malethi.

The barite is coarse and is of grey, greyish white, white and buff colours. Coarse crystalline variety of barite is found as vein fillings along fractures and joints in the adjoining quartzites. Microscopic study has revealed strain effects like bent cleavages and twin lamellae and granulation along fractures. Chalcopyrite, galena, sphalerite and pyrite are present in small amounts, apart from irregular patches of secondary iron oxides.

As the known occurrence of barite in the Himalaya are mostly associated with carbonate suite of rocks, the association of barite mineralization with metaclastic sediments in the present area is of interest. Association of barite beds inter-layered with quartzites of Pre-Cambrian age has also been recently reported from Talya, Chitradurg District, Karnataka (Radhakrishna and Srinivasaiya, 1974).

The origin and economic viability of the barite occurrence near Khairasain is being investigated and shall be reported soon.

The authors are grateful to Prof. R. S. Mithal, Head of the Department of Geology and Geophysics, for extending facilities for the above study.

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