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Department of Mycology and
Plant Pathology,
M.A.C.S. Research Institute,
Law College Road,
Poona 411 004, June 4, 1977.

V. G. RAO.
C. H. PHADKE.

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EFFECT OF ALAR, CCC AND ETHREL ON IAA-OXIDASE ACTIVITY OF LAMINA OF THE BANANA CV. MONTHAN

CONTROL of plant growth in horticultural crops particularly in fruit trees has received the attention of research workers and fruit growers alike for several decades. One of the most recent developments is the use of Alar, CCC and Ethrel to control plant size. They regulate the physiology of treated plants. The effects of CCC and Alar on plants are opposite to those of gibberellin¹⁻³. But Stuart and Cathey⁴ felt that growth retardants should not be called as anti-gibberellins. Many workers have reported that the level of auxin was lowered following treatment with growth retardants¹ Kuraishi and Muir⁵ and Knyp⁶ found that CCC retarded or inhibited auxin mediated growth mechanism. They also concluded that these compounds do not interact directly with gibberellin but with auxin. Thus the terminology has caused controversy. In the auxin studies the possibility of ethylene interference had been recognised when Van der Laan⁷ demonstrated that exposure to ethylene would suppress the amounts of diffusible auxin, presumably by an increase in the activity of IAA-oxidase⁸. Auxin effects are often opposite to those of ethylene⁹. The relevance of these findings in plants is not clear. With this in view experiments were conducted to study the effect of Alar, CCC and Ethrel on the IAA-oxidase activity of the lamina of the banana CV. Monthan.

The tall growing culinary bana CV. Monthan was selected for the study. When the plants were two months old, foliar sprays of Ethrel (2, Chloroethyl phosphonic acid) at 250 and 500 ppm, CCC (2-chloroethyl trimethyl ammonium chloride) at 1000 and 2000 ppm and Alar-85 (Succinic acid-2, 2-dimethyl hydrazide) at 250 and 500 ppm were given till run off. After

spraying, leaf samples (third leaf from the apex as per Hewitt¹⁰ and Murray¹¹) were drawn at 3-day intervals. The middle lamina portion of the third leaf from the apex were chosen for analysis. The colorimetric method¹² was adopted to estimate the IAA-oxidase activity. The oxidation of IAA was measured in Spectronic-20 at 540 m μ . Optical densities were converted to μ g of IAA, employing a standard curve. Activity was expressed as μ g IAA destroyed per gram of fresh tissue in two hours.

It could be seen from Table I that Ethrel 250 ppm increased the IAA-oxidase activity, except on the 3rd day. On the 9th day after spray, a maximum of 38.32% activity was recorded at 500 ppm of Ethrel. The increased activity of IAA-Oxidase would have thus caused decrease in auxin level leading to reduced vegetative growth of banana¹³. This lends support to the reports of Abeles⁹ and Burg and Burg¹⁴ that ethylene causes decrease in the auxin level.

TABLE I

Effect of growth regulators on IAA-Oxidase activity of Lamina of the CV. Monthan Banana (μ g IAA Destroyed/ G fresh tissue/2 hours)

Treatments	ppm	Days after spraying				
		3	6	9	12	15
Ethrel	250	529	654	738	679	797
	500	582	642	888	685	817
CCC	1000	608	667	413	334	771
	2000	638	608	396	433	796
Alar	250	417	708	429	675	750
	500	567	650	679	629	792
Control		563	617	642	658	717

Alar at 500 ppm also showed increase in IAA-oxidase activity except on the 12th day after spray and at 250 ppm it increased the activity from 6 to 15th day. Thus Alar also should have suppressed the endogenous auxin level, supporting the views of Halevy¹⁵ and Kuraishi and Muir⁶. CCC caused increased IAA-oxidase activity initially, decreased activity during the intermediary stages and finally on 15th day, it again increased the activity. In banana, Annadurai¹³ reported slight increase in growth due to CCC sprays. So it is presumed that CCC may likely to interfere in the synthetic pathway of gibberellin, late in the sequence. Such a change would stimulate the growth by CCC, due to switching of the biosynthetic pathway

from the production of normal gibberellin to an abnormal (and incidentally more active) homologue¹⁶.

Department of Horticulture, S. ANNADURAI.
Tamil Nadu Agricultural K. G. SHANMUGAVELU.
University, Coimbatore 3,
July 7, 1977.

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MOSAIC DISEASE OF NASTURTIUM (*TROPAEOLUM MAJUS* L.)—A NEW RECORD FROM INDIA

MOSAIC disease of Nasturtium has been reported from California (Jensen¹, 1950) and Brazil (Silberschmidt², 1953); from India it is the first record. In the year 1976-77, the authors observed this disease in Taj nursery, Agra. Besides the typical mosaic symptoms, the infected Nasturtium plants showed vein clearing and cupping of leaves in both young and mature plants. The infected plants were stunted and excessively branched. The leaves were greatly reduced in size; lamina showed crinkling and lobed margin (Fig. 1. B.). The flowering was either absent or only few.

The virus is readily transmitted from host to host both by graft and sap prepared in phosphate buffer (pH-7.0, 0.02 M) and applied with

carborundum powder as an abrasive. Out of the 8 plants (viz., *Chenopodium amaranticolor* Coste and Regn, *C. album* L., *C. murale* L., *Gomphrena globosa* L., *Datura stramonium* L., *Nicotiana glutinosa* L., *N. tobacum* L. var. white burley, *N. tobacum* L. var. xanthi), commonly used as local lesion hosts, the virus, gave chlorotic local lesions only on *Chenopodium amaranticolor* Coste and Regn, (Fig. 1 C) while all the others did not

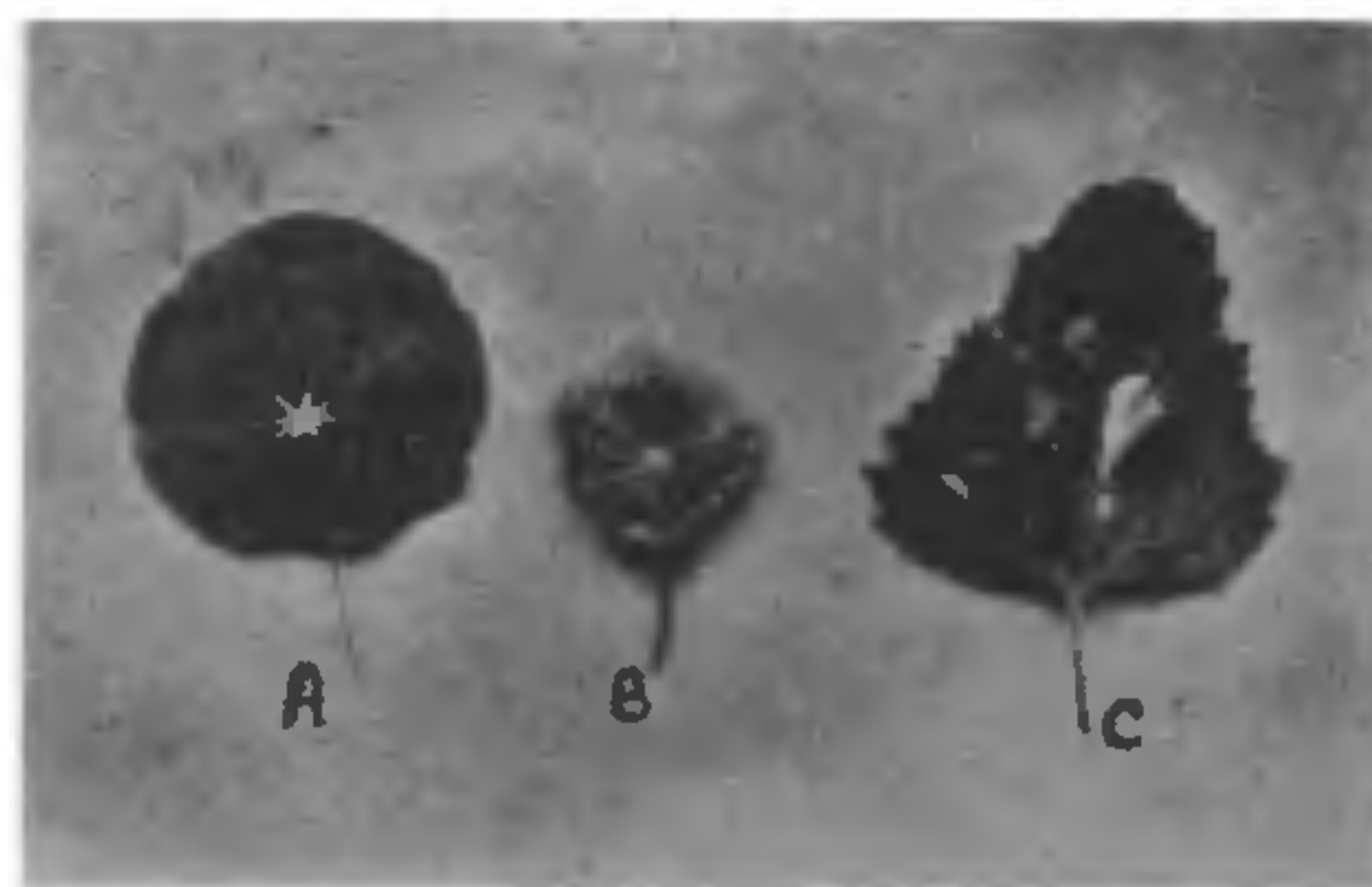


FIG. 1. A, Healthy leaf; B, Diseased leaf; and C, Local lesion on C, *amaranticolor* Coste and Regn.

show the presence of the virus when back inoculations were done on both the host as well as *Chenopodium amaranticolor* Coste and Regn.

Virus Research Lab., M. N. GUPTA.
Department of Botany, A. N. ROY.
Agra College, Agra 282002, KAMLESH C. GUPTA.
July 4, 1977.

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STUDIES ON DEGRADATION OF ANTIFUNGAL ANTIBIOTICS

THE use of antibiotics in plant disease control has assumed importance^{5,6}. In India, antibiotics have given encouraging results in seed treatment against seed-borne diseases¹⁻⁴. Although antibiotics have been evaluated for seed disinfection, no information is available about their behaviour when treated seeds are stored. Studies on this aspect are reported.

Paddy seeds were treated with piomy and aureo-fungin at 500 ppm. The biological activity of the antibiotics soon after seed treatment was determined by plating the seeds on potato-dextrose-agar seeded with *Helminthosporium oryzae*. The inhibition zone was observed around the treated seeds indicating the presence of antibiotics. The treated and untreated seeds were stored in cloth bags at room temperature,