application of methionine is 50·4 hrs. when BA or kinetin is used for pre-treatment and 31·2 hrs. when distilled water is given as pre-treatment. Similarly, when alanine is applied, following a pre-treatment of leaves with BA and kinetin, the time taken for 50% abscission is 87 and 63 hrs. respectively, while it is 39 hrs. when leaves are pre-treated with distilled water.

It is thus clear that the accelerating effect of amino-acids methionine and alanine on abscission of debladed petiole is mitigated by a prior treatment of leaves with cytokinins. In view of the known effect of cytokinins on RNA and protein synthesis,[7] it is possible that the enhanced protein synthesis may be causing greater incorporation of the applied amino-acids and consequently the promotive effect of these on abscission are mitigated. The other interesting point is that the extent to which the accelerating effect of amino-acids is mitigated varies with the cytokinin and the amino-acid. The maximum effect is observed with prior treatment of leaves with BA followed by application of alanine.

Prior treatment of leaves with cytokinins has also resulted in enhancing the delaying effect of IAA on abscission. This confirms the earlier observations made with benzyl adenine only.[1]

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A LEAF SPOT OF *ACROCARPUS FRAXINIFOLIUS* W.

Acrocarpus fraxinifolius W. is a common shade plant grown in the coffee and cardamom areas in South India. During my investigations on the leaf-rot of cardamom caused by *Phaeodactylium Venkatesanum* Agnihothrudu in Malabar Wynaad, I came across a leaf spot of *Acrocarpus fraxinifolius* W. both in the main fields where it is used as a shade as well as in the seedling nurseries of this shade plant. The fungus was found to be a new species of *Cercospora* which is described below:

Cercospora acrocarpicola AGNIHOTHRUDU, SP. NOV.

Leaf spots circular to irregular 3–10 mm. in diameter, reddish-brown, sometimes with pale brown to greyish centre. Fruiting hypophyllous, stromata dark olive-green, globular upto 40 μ in diameter, fascicles dense, conidiophores pale olivaceous or subhyaline, uniform in colour, slightly tapering, apically smooth, straight or gently undulate, 1–3 septate, unbranched with a conical tip, measuring 15–30 (–36) 3–4·5 (–5) μ; conidia subhyaline to dilute olivaceous, obclavate, cylindric, smooth-walled, straight or slightly sinuous, distinctly 2–4 (–5) septate with a subtruncate base and a rounded to conic tip measuring 35–60 (–64) × 3–4 (–5) μ.

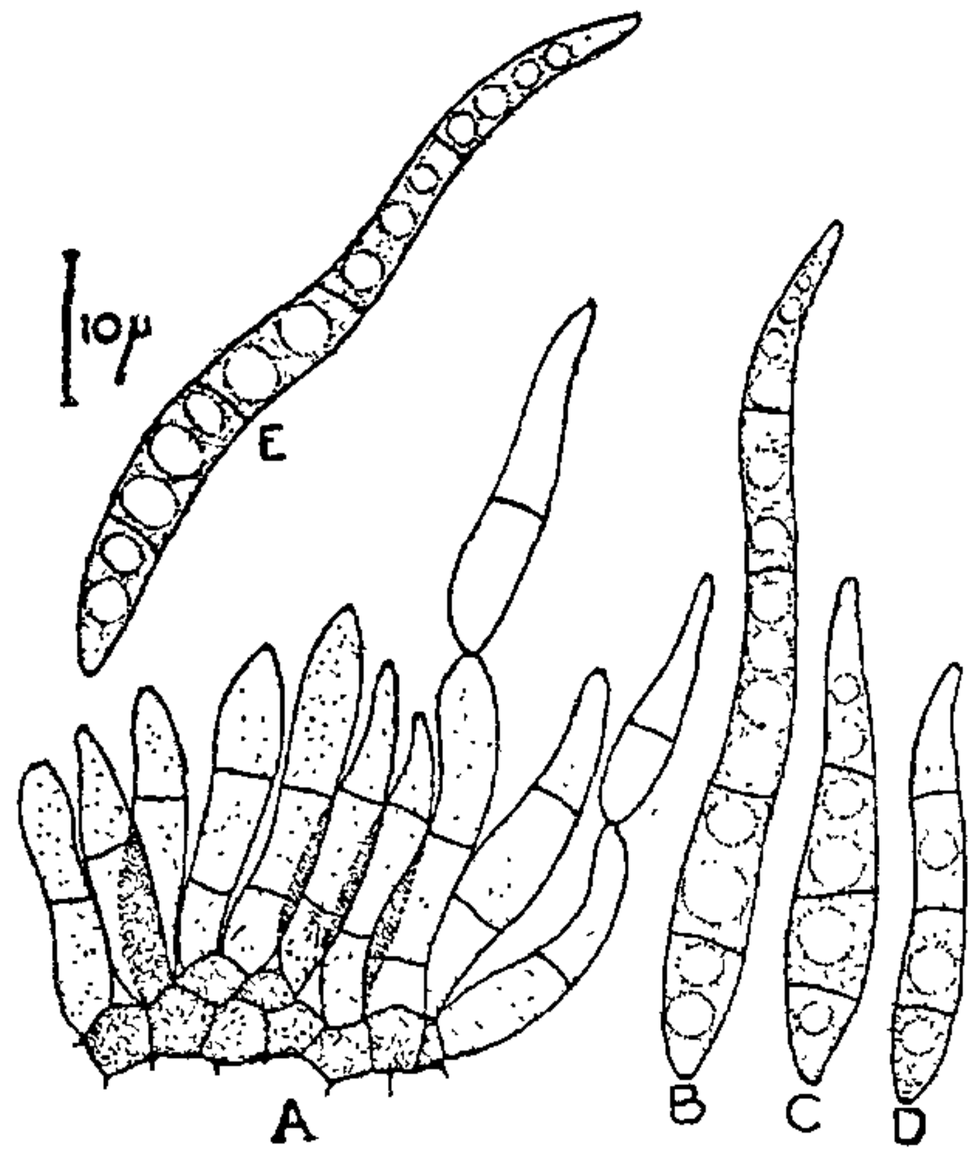

FIG. 1. *Cercospora acrocarpicola* Agni. sp. nov. on *Acrocarpus fraxinifolius* W.
A—Conidiophores; B, C, D, E—Conidia.

Type on living leaves *Acrocarpus fraxinifolius* W. collected at Chulika Estate, Malabar Wynaad, Kerala, dated 14-5-1970, by V. Agnihothrudu, deposited in the Mycological Herbarium, Rallis India, Ltd., under No. 12.

Cercospora acrocarpicola AGNIHOTHRUDU SP. NOV.

Foliorum maculae ciculares vel irregulares 3–10 mm. diam., rubiginosae, quandoque versus

centrum pallide brunneae vel griseae. Stromata fructifera hypophylla, atro-olivacea, globularia, usuue 40 μ diam., fasciculi conferati; conidiophora pallide olivacea vel subhyalina, uniformiter colorata, parum versus apicem attenuata, laevia, recta vel leviter undulata, 1–3 septata, haud ramosa, apice conico, 15–30 (–36) × 3–4·5 (–5) μ. Conidia subhyalina vel pallide olivacea, obclavata, cylindrica, parietibus laevibus, recta val paulo sinuata, distincte 2–4) (–5) septata, basi subtruncata et apice ritundato vel concideo, 35–60 (–64) × 3·4 (–5) μ.

Typus supra folia viventia *Acrocarpi fraxinifolii* W. die 14 mensis maii 1970 ab V. Agnihothrudu ad praedam Chulika, Malabar Wynaad, Kerala, lectus et in herbario mycologico Rallis India Ltd., sub numero 12 positus est.

I am grateful to Mr. D. K. Ghandhi, Director, Rallis India Limited, for permitting me to publish this article, to Rev. Cecil J. Saldanha for rendering the Latin diagnosis, to Mr. R. A. Padmanathan, Chief Executive, M/s. A. V. Thomas and Company, for arranging my visit, and to Mr. Patrick John, for taking me round Chulika Estate.

Fertiliser and Pesticides Division,
Rallis India Ltd., P.B. No. 168,
Bangalore-1 B, *September* 10, 1970.

V. Agnihothrudu.

PECTIC AND CELLULOLYTIC ENZYMES OF *XANTHOMONAS MALVACEARUM*, THE INCITANT OF BACTERIAL BLIGHT OF COTTON

Pectic and cellulolytic enzymes have been shown to be involved in the pathogenesis of several fungi and bacteria.[1–6] There has been some controversy regarding the production of pectic enzymes by *Xanthomonas malvacearum* (E. F. Smith) Dowson, the causal organism of bacterial blight of cotton in *in vitro* condition.[7] This was due to the failure to recognise the adaptive (induced) nature of enzyme production. Abo-El-Dahab[7] reported abundant pectinmethylesterase (PME) formation by five isolates on basal medium + pectin, whereas it was absent on BM + sucrose. We have a large collection of isolates of *X. malvacearum* and selected races[8] 10 and 3 for enzymatic studies with a view to elucidating their role in pathogenesis.

The cultures were grown on nutrient broth (NB) and NB + pectin (P) at 28° C. for 48 hrs. after which they were centrifuged at 12,000 r.p.m. for 45 min. and the clear supernatant was directly used as the crude extracellular enzyme extract. The enzyme activities are given in Table I.

Table I

Pectic and cellulolytic enzymes of two races of Xanthomonas malvacearum

Race No.	Medium	Cellulase*	Macerating enzyme: Potato disc method†	Macerating enzyme: Colorimetric method‡ Water	Na^+	Ca^{++}
3	NB	35·5	–	0·01	0·01	0·14
3	NB+P	46·9	+	0·04	0·03	0·36
10	NB	58·2	–	0·03	0·05	0·30
10	NB+P	12·3	+	0·03	0·03	0·27

* Per cent. reduction in viscosity of 0·6% carboxymethyl cellulose in 4 hours, † Loss in coherence of turgid potato discs (1 mm. thick and 12 mm. in diametre) at the end of 72 hours. Maceration was earlier in race 10, ‡ Reaction mixture: 5 ml. pectin (1%) containing 0·1 M $CaCl_2$ or 0·01 N NaCl + 5 turgid potato discs; incubated at 35°C. for 24 hours. Requirement of Ca^{++} is shown.

Both the isolates produced the macerating enzyme only on NB + pectin medium, when the loss in coherence of potato discs was used to determine the enzyme activity. Maceration was earlier in race 10, which goes on 7 of the 8 differentials,[8,9] while race 3 goes on only 4 differentials.[9] Race 10 is also more widely distributed.[8,10] When the macerating enzyme activity was studied by a colorimetric technique,[2] it was confirmed that race 10 produced greater amount of macerating enzyme. Further, it was shown that the enzyme was produced both on NB and NB + P to more or less similar extent by race 10, whereas race 3 produced appreciable quantity only on NB + P, thereby showing a strain differentiation in the capacity for producing the enzyme. It is also indicated that probably colorimetric method is better than the potato disc method to determine macerating enzyme activity.

Cellulase activity was present in both the races to quite an appreciable degree on both the media, *i.e.*, NB and NB + P.

Attempts to show the presence of transeliminase activity have failed so far. Both the isolates reduced the viscosity of 1% pectin solution and also released some methoxy groups on both the media indicating that both PG (polygalacturonase) and PME are present. Work is now in progress to identify the individual PG and will be published shortly.