

quinoline (I).¹ It is now found that (I) could also be readily obtained by the application of the Conrad and Limpach method: the crude anil from aniline and ethyl benzoylacetoacetate (prepared by using a trace of hydrochloric acid as a catalyst) cyclises to (I) in good yields by heating in diphenyl ether. This observation confirms also its constitution suggested by Desai and Shah.¹ In this reaction an isomeric product found identical with 4-hydroxy-2-methyl-3-benzoylquinoline² (II) obtained by Thakor and Shah² by Friedel-Crafts benzoylation of 4-hydroxy-2-methylquinoline, is also formed in small quantities.

It is interesting to note that in the above condensation with aniline, C-benzoyl ethyl acetoacetate gives good yields of (I) and (II); as with ethyl benzoylacetoacetate only poor yields of the corresponding quinolines are obtained,^{3,4} although ethyl acetoacetate itself affords 4-hydroxyquinolines readily.³

S. A. KULKARNI.
V. M. THAKOR.
R. C. SHAH.

Organic Chem. Labs.,
Royal Institute of Science,
Bombay,
October 27, 1949.

1. Desai and Shah, *J. Indian Chem. Soc.*, 1949, **26**, 121. 2. Unpublished work. 3. *Ber.*, 1887, **20**, 944, 948; 1888, **21**, 521, 523; Limpach, *ibid.*, 1931, **64B**, 969, 970; 4. Elderfield, *et al.*, *J. Amer. Chem. Soc.*, 1946, **68**, 1212.

ON THE BIOLOGICAL CONTROL OF *STRIGA* SPECIES

IN his note (*Curr. Sci.*, 1949, **18**) on the caterpillar of *Precis oritya*, Swinhæi L. feeding on *Striga* spp., a parasite of sugarcane and jowar, Mr. D. V. M. refers to Prof. Kumar's report (Kumar, L. S. S., 1939) on a certain caterpillar feeding on *Striga*

densiflora. Presumably Prof. Kumar recommended this caterpillar for the eradication of *Striga*. Early in 1935 the author² encountered a similar case of attack of *Striga Lutea* (Lour) occurring on the hill paddy in Malabar, by the grubs of a beetle identified as belonging to Galerucine sub-family by the Government Entomologist, Coimbatore. The grubs were found to be highly predatory on *Striga* sparing no parts of it, including the stem, leaves and the pods. Large-scale rearing of this beetle for the biological control of *Striga* in infested rice fields was suggested by the author. Agri. Res. Institute, P. UTTAMAN, Coimbatore, October 10, 1949.

1. Kumar, L. S. S., "Report, regarding his visit to H. E. H. the Nizam's Dominions to enquire into the attack of the parasitic flowering plant *Striga* on sugarcane and jowar (unpublished), 1939. 2. Uttaman, P., "Parasitism of *Striga lutea* (Lour) on Rice with special reference to its histology and anatomy" Thesis for M.Sc. of the Madras University.

MOUND-FORMING TERMITES AND THEIR CONTROL

DURING our investigation on white-ants and mound-forming termites, the following interesting observations have been recorded:

A mound is 'live', if repairs are done immediately on breaking open one of the 'towers'.

By placing a powerful magnetic compass at the centre of a mound, it is possible to locate the position of the 'Queen'. The 'Queen' invariably lies nearly parallel to the magnetic N and S in her cell which is on the NE or in a very few cases SW of the central point of the 'live' mound.

The 'fungus gardens' differed in different mounds not only in construction but

also in the manner of the proliferation of their hyphæ. Like an expert gardener the termites keep the hyphæ as if pruned to the very minimum.

In the control of termite mounds, benzene hexachloride, D.D.T., pyrethrum and crude oil, in various formulations, were used and a technique has been developed to get the best results by their application.

Thanks are due to Messrs. Geigy Insecticides Ltd., of Bombay, and other insecticidal concerns for their help and co-operation. Maharashtra Association P. J. DEORAS. for the Cultivation of Science, Poona 4, November 14, 1949.

1. George, R. A., *J. Econ. Ent.*, 1944, 37, 140. 2. Swingle, M. C., and Mayer, E. L., *ibid.*, 1944, 37, 142. 3. Kelsey, J. M., *N. Z. J. Sci. Tech.*, 1945, 26, (B6), 353. 4. Wolcott, *J. Econ. Ent.*, 1945, 38, 493.

THE INFLUENCE OF AVAILABLE CARBOHYDRATES UPON AMMONIA ACCUMULATION BY *PENICILLIUM NOTATUM* WESTL.

THE role of available carbohydrates on ammonia accumulation with reference to *Aspergillus niger* van Tieghem, was first explained by Waksman⁴ and later by Thakur and Norris² with reference to certain soil fungi.

The present work deals with a determination of the effect of the available carbohydrates on ammonia accumulation by *Penicillium notatum* Westl. obtained from the Indian Agricultural Research Institute, New Delhi.

Four litres of a medium composed of:— Peptone, 20 gm.; K_2HPO_4 , 1.0 g.; $MgSO_4$, 0.5 g.; KCl, 0.5 g.; $FeSO_4$, 0.01 g.; and dist. water 1,000 ml. 2% Dextrose (anhydrous, C.P.) was added to two litres of medium, and the other two litres were left without any dextrose. 100 c.c. of the medium was poured in 200 c.c. Erlenmeyer flasks and autoclaved at 15 lbs. pressure for 15 minutes. The rest of the procedure was almost the same as that adopted by Waksman.⁴

Dextrose in the medium had a marked effect on the accumulation of ammonia. In the medium lacking in dextrose though the growth of the fungus was slow, as was apparent from the dry weights of the

mycelium, yet large quantities of ammonia accumulated in the medium from the third to the sixteenth day (Fig. 1). Where dextrose was present, the ammonia accumulated in very small quantities, while the weight of the mycelium increased considerably till about the seventh day, when probably autolysis set in and the weight of the fungal matter began to decrease gradually.

Due to the heavy accumulation of ammonia in the medium lacking dextrose the reaction of the medium became more and more alkaline till at the end of the sixteenth day the pH was 7.6, the initial pH being 6.5. While in the medium containing dextrose the pH at the end of the sixteenth day fell to 5.1 possibly due to an increased production of organic acids.

It was found that greater amounts of amino-nitrogen were utilised by cultures to which dextrose was added, as manifested by the smaller amount of amino-nitrogen. The accumulation of ammonia however in such cultures is far less than what obtains in the sugar-free medium, since the nitrogen is synthesised into fungal protein (Fig. 1).

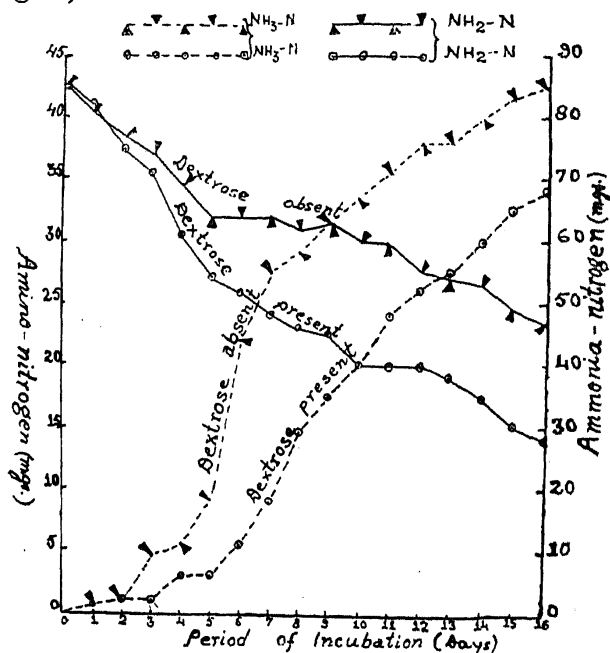


FIG. 1. Change in amino-nitrogen content of the medium and ammonia accumulation by *Penicillium notatum* during the period of incubation.

Thus the presence of available carbohydrates will be of ultimate benefit to the crops provided:

1. The amount of available carbohydrates is not very large, otherwise the microorganisms will merely live on that source of energy, breaking up only as much of the