smaller size range and presence of depression (± pore) in the central region. Distalalunisporites Klaus (1960) is roundly triangular in shape, possesses a distinct, well-developed trilette mark and a circular annulus in the middle. Cooksonites Pocock (1962) is hilate and has a well-developed cingulum. Coptospora Dettmann (1963) is as asymmetrically thickened along the equator and distinctly hilate while the present genus is operculate. Classopolis (Pflug) Pocock and Jansonius (1961) and Giscopolis Venkatachala (1966) both possess equatorial tenuitias on the distal side bordering the operculum. Granuloperculatumpolis Venkatachala and Goczan (1964) is distinguished by the presence of the distal pore and the granulose ornamentation. Katrolaites proposed here is differentiated from all the known genera by its circular shape, more or less differentially thickened, laggivate and intrapunctate exine, absence of haptotypic mark and presence of an operculum in the distal polar region.

**Remarks.**—Though closely comparable to Coptospora Dettmann (i.e.), the genus Katrolaites is readily distinguishable. Doubt may arise as to the nature of the opening (hilum) in Coptospora. It may be interpreted that by the detachment of the operculum in Katrolaites Coptospora-like forms can be resulted. The distal opening in Coptospora is mostly ill-defined, not confronting to any regular shape, while the operculum in Katrolaites is mostly well defined and circular. We have not observed any spore with detached operculum.

**Katrolaites kutchensis sp. nov.**

**Holotype.**—Fig. 1. Size 64 × 58 μ.

**Type Locality.**—Bandra, near Bhuj, Katrol Stage (Jurassic), Gujarat, India.

**Specific Diagnosis.**—Circular, 56–66 μ. Exine ± differentially thickened, lagvigate and intrapunctate. Operculate, operculum on distal side, well defined.

**Description.**—Mostly circular, sometimes subcircular. Tetragonal mark present in some specimens. Exine 2–3 μ thick, differentially thickened at the equatorial region. Operculum circular—subcircular, 30–38 × 26–34 μ, mostly confronting with the general shape of the spores. Operculum intact, sometimes with small, radial folds on the proximal side.

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Palaeobotany, R. K. Kar.

Lucknow, August 14, 1967.

**Figures.** 1–4. *Katrolaites kutchensis* gen. et sp. nov. Fig. 1. Holotype, note the distal operculum and radial folds, ca × 500. Fig. 4. Note the tetragonal depression mark but not associated with suture, ca. × 500.


**ISOLATION OF MONOCROTALINE AND CRISPATINE FROM CROTALARIA LECHNAULTII**

Monocrotaline occurs in several other species of Crotalaria while Crispatine has been reported so far only from *C. crispata*.

A sample of the seeds assayed by the method of Culvenor and Smith was found to contain 5.25% tertiary bases and 0.67% *N.* oxides. The dehusked powdered seeds of *C. lechnaultii* (300 g) were defatted with *n*-hexane. The petroleum ether exhausted residue was further extracted with ethanol (95%) in a Soxhlet apparatus for 35 hours. The concentrated mass (60 g.) on TLC using silica gel G and chloroform, methanol, ammonia (85 : 14 : 1) showed 3 spots Rf, 0–0, 0.32, 0.40 and on paper chromatogram 0.0, 0.43, 0.61 (n-Butanol : 5% acetic acid, upper phase). The residue was triturated with dilute sulphuric acid (5% v/v) basified and extracted with chloroform. Removal of chloro-
form gave 15 g. of crude mixture of two alkaloids A and B (R, 0·32 and 0·40 respectively on TLC). The residual aqueous solution was acidified to pH 2, reduced with zinc dust, filtered, basified and extracted with chloroform which yielded additional quantities of mixture of A and B.

Attempts to isolate A and B by fractional crystallisation in different solvents failed. The crude mixture (3·5 g.) of A and B was dissolved in chloroform and applied to a column of neutral alumina (250 g. activity grade I) and by graded elutions yielded 1·5 g. B (Benzene), 0·3 g. A + B mixture (Benzene : Chloroform) and 1 g. if A (Chloroform : Ethanol).

Alkaloid A (R, 0·32) m.p. 195° (lit.4 monocrotaline 196–197°), picrate m.p. 230° (lit.4 231°) and methiodide m.p. 205° (lit.4 205°). The alkaloid A was finally proved to be identical with monocrotaline by a mixed m.p. which was undepressed.

Alkaloid B m.f. 136° (lit.4 crisatyine 137–38°). Elemental Analysis: Found C 61·0; H 7·6; N 4·6%, calculated for C_{15}H_{22}O_{5}N (Crisapatine) C 62·1; H 7·5; N 4·5%.

Alkaline hydrolysis of Alkaloid B was carried out with 2% sodium hydroxide at room temperature for 18 hours. The aqueous solution was extracted with ether to remove hydrolysed base, acidified with dilute HCl and again extracted with ether. Acid ether extractions on evaporation and crystallisation from benzene gave colourless needles m.p. 133° (lit.4 133–34°).

The aqueous residue was evaporated to dryness in a vacuum desiccator. The crystalline residue on extraction with cold alcohol yielded necine-HCl m.p. 180° (after repeated crystallisation from acetone) undepressed on admixture with authentic retronecine hydrochloride.

The alkaloid B was finally proved to be identical with crisapatine by comparison of IR spectrum.4

We are grateful to the Director, Central Drug Research Institute, Lucknow, for elemental analysis and IR spectra.

Regional Research Laboratory, O. P. SURI
Jammu, August 8, 1967. C. K. ATAL

ON THE CHEMICAL INHIBITORS OF FUNGAL SPORES FROM THE SEEDCOATS OF THREE PLANT SPECIES

The presence of antimicrobial agents on the seedcoats of some plant species was reported by Bowen.1 Thompson2 reported that extracts of subterranean clover seedcoats contain a thermostable, water-soluble antibiotic which is inhibitory to a strain of Rhizobium trifolii Dangeard. Garber and Houston3 reported the presence of an inhibitor to Verticillium albo-atrum Rein. and Bert. in the seedcoats of both wilt-susceptible and wilt-resistant cotton varieties. The presence of such an inhibitor to the spores of Helminthosporium oryzae Breda de Haan, the fungus causing leaf-spot disease of rice, in the seedcoats of sorghum, ragi and tomato is reported here.

One hundred seeds of each of the three plant species, viz., sorghum (Sorghum vulgare Pers.), ragi or finger millet (Eleusine coracana Gaertn.) and tomato (Lycopersicon esculentum Mill.) were surface sterilized with 0·1% mercuric chloride solution and washed in sterile distilled water. They were added separately to 100 ml. of sterile distilled water contained in 250 ml. Erlenmeyer flasks. The contents were shaken for 6 hr. on a wrist-action shaking machine. Then the suspension was filtered free from seed and other suspensions and the filtrate concentrated in vacuo to a final volume of about 5 ml. This concentrate, hereafter referred to as 'seedcoat leachate' was tested for its activity on the spores of Helminthosporium oryzae.

One drop of the spore suspension in sterile distilled water of the fungus, obtained from the growth on oatmeal agar, was placed in the cavity of a microscope slide. To this a drop of the test chemical, i.e., the seedcoat leachate, was added. In the case of checks, additional drop of sterile water was added to the spore suspension in the cavity slide. The slides were incubated in moist chambers at room temperature (22–25°C.) and periodic observations were made. The germination per cent was calculated by examining 100 spores in each microscopic field and taking the average of 10 fields under each treatment. The results are presented in Table I.

There was not only delay in spore germination due to the chemicals, but also there was considerable inhibition of germination and germ-tube growth. The germ-tubes arising from the seedcoat leachate-treated fungal spores were invariably malformed, with characteristic