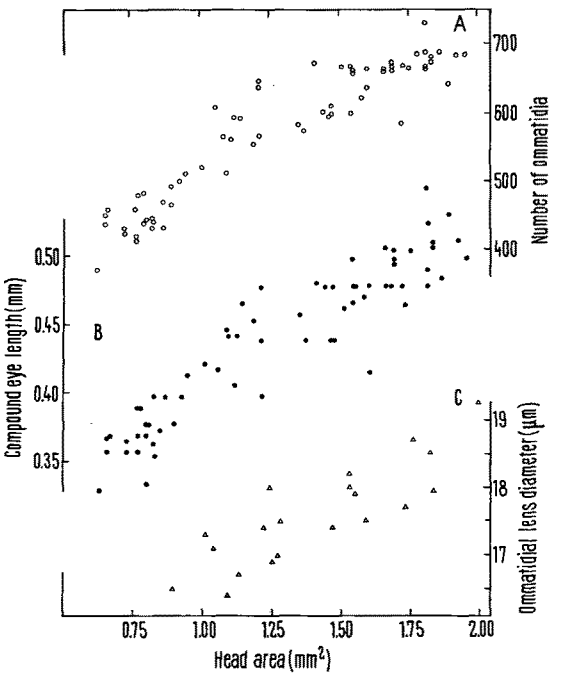

Fig. 2. Scatter plots of eye-head relationships, with eye parameters on the ordinate and head area (mm^2) on the abscissa. A) (open circles) Number of ommatidia vs. head area. B) (filled circles) Compound eye length (mm) vs. head area. And C) (open triangles) ommatidial lens diameter (µm) vs. head area.

increased acuity (larger number of ommatidia in a given visual angle). If this interpretation is applicable to the worker ant population from a single nest it could be an important factor in the previously reported correlations between worker size and foraging navigation efficiency[1].

Résumé. Pour compter le nombre de facettes de l'œil composé de la fourmi, une nouvelle méthode a été mise au point en utilisant des photographies d'empreintes de collodion. Dans une population d'ouvrières provenant d'un seul nid de fourmis rouges lignicoles, le nombre et le diamètre des facettes augmentent avec la grosseur de l'œil et de la tête. Pour une telle population il y a une relation entre la grosseur des tissus neuraux et sensoriels, l'œil composé inclus, et l'efficacité avec laquelle une fourmi ouvrière parcourt le terrain en cherchant de la nourriture.

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Induced Production of Cleistothecia in *Aspergillus unguis*

The members of the *A. nidulans* group of RAPER and FENNELL[1], excepting *A. unguis*, are characterized by the prolific production of cleistothecia in culture. These authors, therefore, cast an aura of serious doubt on the validity of the species *A. unguis*, as inscribed below: 'The discovery of occasional cleistothecia and ascospores in a culture with structural pattern and general morphology of *A. unguis* raises some doubt concerning the validity of this species, particularly when the ascospores exhibit the general pattern of those present in *Aspergillus nidulans*. We believe, however, that the species *A. unguis* should be retained, at least for the present, to include the numerous strains belonging to the *A. nidulans* group, which grow restrictedly on many substrata, produce long sterile spicular hyphae, and are commonly isolated from soil and from situations indicating at least secondary pathogenicity.'

In this paper, the authors report the composition of a modified version of the normal Czapek's medium (Table I), which successfully permits the induction of cleistothecia in the normally asexually reproducing cultures of *A. unguis*, with the result that the retention of the species *A. unguis* in the nidulans group becomes entirely redundant.

Materials and methods. The culture of *A. unguis* figuring in this experiment was from KAKKAR's personal collection (No. RBK/301), and was originally isolated from heavily manured soil, but it is of interest to record that, during its entire period of retention under cultural conditions, it failed to produce cleistothecia and ascospores, in contrast to Strain WB 2393 of RAPER and FENNELL[1] described above.

Our previous investigations have already established[2] that the 2 genotypes in *Aspergillus* species can be conveniently grouped with regard to caffeine sensitivity, under 2 distinct heads, viz., 1. the caffeine-resistant (CR) and 2. the caffeine-sensitive (CS). Both *A. nidulans* and *A. unguis* display, under controlled cultural conditions, a slow but definite growth pattern on caffeine reinforced medium, thus showing, that they are definitely CR. This response was obtained even at the abnormally high concentrations of caffeine viz., at 6 to 10 g/l during the incubation period of 45 days.

The medium was accordingly modified, and the modified Czapek's medium containing sucrose, 10 g; KH_2PO_4, 1 g; $NaNO_3$, 3 g; KCl, 0.5 g; $MgSO_4$, $7H_2O$, 0.5 g; $FeSO_4$, 0.01 g and caffeine 6 g/l, with pyrex-thrice-distilled water

Table I. Constitution of modified Czapek's medium reinforced with caffeine

Medium (g)	
Sucrose (10)	$FeSO_4$ (0.01)
KH_2PO_4 (1)	Caffeine (6–10)
$NaNO_3$ (3)	
KCl (0.5)	Pyrex thrice distilled water
$MgSO_4$, $7H_2O$ (0.5)	up to 1 l

pH of the medium, 6.5.

[1] K. B. RAPER and D. I. FENNELL, *The Genus Aspergillus* (The Williams and Wilkins Co. Baltimore, USA 1965), p. 526–527.
[2] R. K. KAKKAR and B. R. MEHROTRA, unpublished data (1970).

Table II. Comparative details of cleistothecia, asci and ascospores of *Aspergillus nidulans* and *A. unguis* produced in modified Czapek's medium reinforced with caffeine in the concentration of 6 g/l

Name of the organism	Cleistothecia	Asci	Ascospores
A. nidulans	Abundant; Mature Cleistothecia globose, ranging from 150–230 μm, surrounded by cinnamon colored layer of hyphae bearing hülle cells	Asci reddish brown; globose; containing 8 ascospores; bursts readily setting free the ascospores; asci 7–10 μm in diameter	Purple red; lenticular; smooth walled; with 2 equatorial crests; spore bodies 3.8 to 4.6 μm in length by 3.3 to 4.1 μm in breadth
A. unguis	Abundant; Mature cleistothecia globose; brown; ranging from 180–250 μm, surrounded by thin envelope of globose hülle cells	Asci subglobose to globose; each ascus containing 8 ascospores; bursts readily; asci 9.9–11 μm in diameter	Lenticular; purplish-red smooth walled; with 2 equatorial crests; spore bodies 4.4–5.5 μm in length by 2.75 to 3.3 μm in breadth

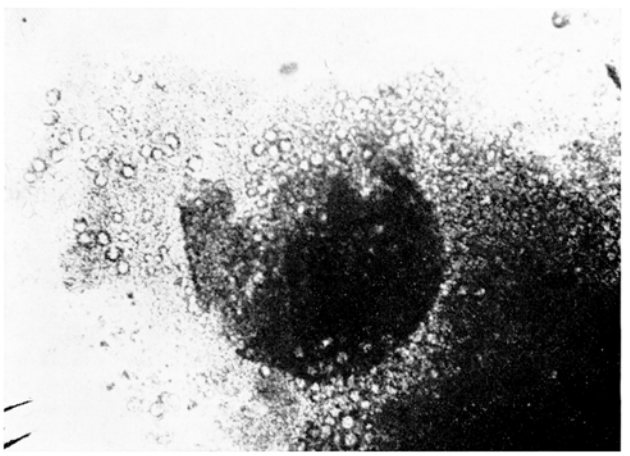

Fig. 1. The bursting cleistothecium of *A. unguis* with 'hülle' cells. ×480.

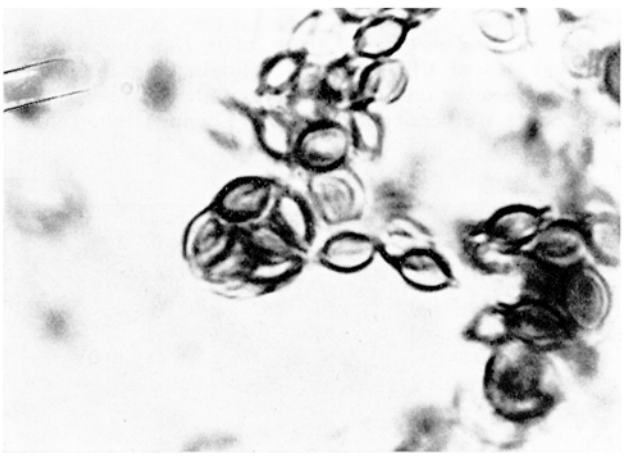

Fig. 2. Ascus of *A. unguis* with 8 ascospores (enclosed) and scattered lenticular ascospores with 2 equatorial crests. ×800.

up to 1 l, was apportioned in pyrex (white label) 150 cm³ Erlenmeyer flasks, each flask containing 25 cm³ of the culture medium. The flasks containing the culture solution were subjected to fractional sterilization in Arnold's steamer, by steaming them for 30 min each day for 3 consecutive days. The pH of the culture fluid was 6.5 as denoted by Beckman's pH meter.

The inoculum was prepared from conidia of the respective cultures viz., *A. unguis* and *A. nidulans*, which were washed thrice with centrifugation, and subsequently suspended in double distilled water. Seeding was performed by pipetting 0.25 cm³ of the standardized spore suspension (approximately 25,000 spores) into the flasks containing the culture medium. After inoculation the culture flasks were incubated at a fixed temperature of 25 ± 1 °C for 45 days.

Results and discussion. The results of a typical experiment are delineated in Table II, showing the details of various measurements regarding cleistothecia, asci and ascospores of *A. unguis* and *A. nidulans*.

A feature of great interest, in this investigation, was the exclusive appearance of cleistothecia in cultures of *A. unguis*, with the simultaneous suppression of the conidial production. Our repeated endeavours have conclusively proved this fact, which was only a casual observation in the beginning, that, under the adaptational stress of caffeine, the asexual expression in *A. unguis* is completely masked and the sexual expression is awakened.

The authors are, therefore, tempted to hazard the explanation that the current concepts regarding the masking and unmasking of gene strings by the histone envelope[3] may be of value, at this juncture, to explain the divurgent responses of this isolate (viz. asexual and sexual expressions) in the unsupplemented medium, and the medium reinforced with caffeine. However, at this stage, it is rather too premature for us to suggest the precise site of action (operon?), which triggers this alteration of expression, and tilts the balance from the conidial to the cleistothecial production.

In view of the experimental findings delineated above, we seem to have struck a stage where the further retention of *A. unguis* as valid 'species' of the genus *Aspergillus* appears to be wholly unwarranted. We, therefore, resolve to reduce the hitherto acknowledged level of 'species' of *A. unguis* to the level of synonymy and put it as a valid synonym of *A. nidulans* as inscribed: *Aspergillus nidulans* (Eidam) Wint. Synonym: *Aspergillus unguis* Emile-Weil and Guadin[4].

Résumé. Synonymie *Aspergillus unguis* et *A. nidulans* basée sur l'obtention de périthèces chez *A. unguis*.

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[3] J. Bonner and J. E. Varner, *Plant Biochemistry* (Academic Press Inc., New York, USA 1965). – R. Chi. C-Huang, J. Bonner and K. Murray, J. molec. Biol., *8*, 54 (1964).

[4] The authors record their debt of deep gratitude to the authorities of University Grants Commission at New Delhi, who have generously financed this research program by the grant-in-aid to one of us (B.R.M.).