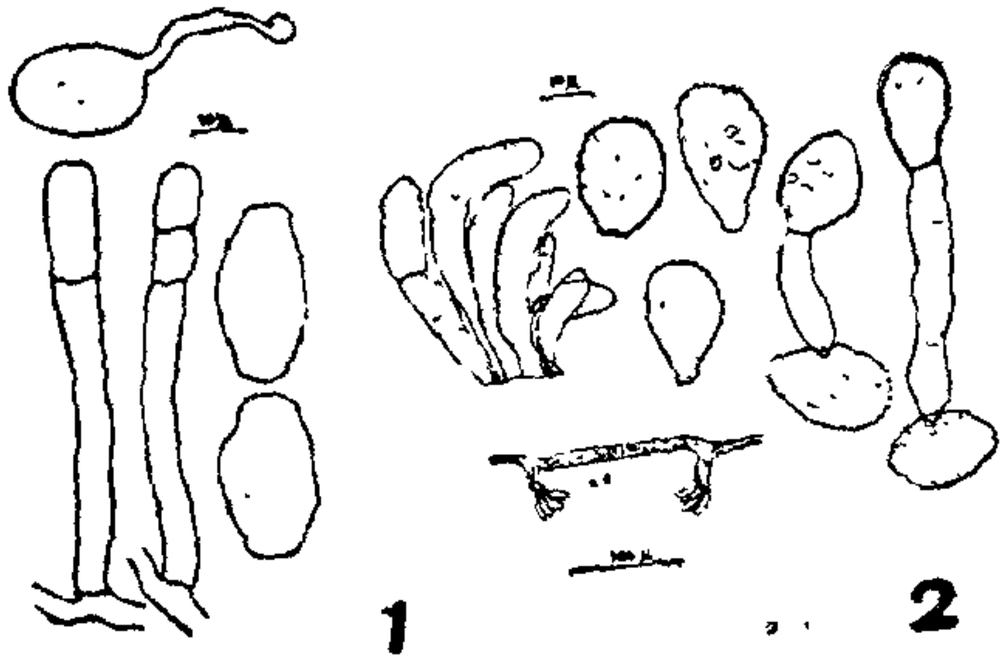

FIGS. 1-2. Fig. 1. *Acrosporium greviae* sp. nov. Fig. 2. *Phakopsova greviae* (Pat. & Har.) Cumm.

finely echinulate, 1–1·5 μm thick with lateral pore, obscure first but visible after germination (Fig. 2).

Urediospores germinate within 24 hr in tap water at 13°–19°C, germination by lateral germ tubes, septate or nonseptate and form a club-shaped or clavate appressoria sometimes equal to the size of spore.

Habitat : On leaves of *Grewia asiatica* L. (Tiliaceae), Krishinagar, Jabalpur, 20-12-1977, leg. N. D. Sharma and A. C. Jain. The type specimen has been deposited in Herb. IMI No. 217529.

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SEROLOGIC RELATIONS AMONG SOME BLUE GREEN ALGAE

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THE traditional taxonomy of blue green algae has been well epitomised by Geitler[6] and Desikachary[3] who have also drawn attention to the inherent limitations in the delimitation of generic and species boundaries in some cases. The confusion is particularly more in Chroococcales, which was further accentuated by the taxonomic revision proposed by Drouet and Daily[5]. Stainer *et al.*[16] attempted to use the major internal divergences of DNA base composition to obtain clues for the development of a more satisfactory system of classification and based on this they grouped the unicellular blue green algae into three major typological groups. Based on the variations in cellular dimensions of the strains grown in different culture media, Padmaja and Desikachary[9] employed interquartile ranges (IQR) to delimit various forms of coccoid blue green algae. These studies suggested that the commonly designated *Anacystis nidulans* was really a *Synechococcus* (*S. elongatus*)[9] and also supported Hollerbach's merging of *Gloeocapsa* and *Chroococcus*[8].

In the present investigation, immune-diffusion technique is used to examine the serologic relationship between *Anacystis nidulans* and 9 Chroococcalean and 3 Nostocalean members as well as one eucaryotic unicellular green alga (Table I). Table II summarizes the most important taxonomic characters of the algal forms. The genus *Chlorogloea* is placed in Entophysalidaceae by Geitler[6] and Desikachary[3]. The formation of heterocysts in this alga led to the suggestion for its transfer to Nostocales[5]. It was subsequently raised to a new genus, *Chlorogloeopsis* and assigned to the order Stigonematales[7].

A. nidulans was grown in Bothe medium[1]. *Chlorogloea fritschii* in Detmer medium[12], *Spirulina platensis* in Zarrouk medium[13] and other forms in Chu 10[2]. Liquid cultures were grown without aeration in Erlenmeyer flasks of 250 ml capacity at 28 ± 1°C. Illumination was provided by two white fluorescent tubes and the light intensity was usually adjusted to lie in the range of 2000-3000 lux at the surface of the culture vessel as measured with Luxomet illumination meter, Model 300. *Gloeocapsa* ARM 338 required low light intensities of about 500 lux for normal growth. Rabbit antisera were prepared with whole cell antigen of *A. nidulans* (10^7 cells/ml) with a titre value of 12,800 according to the modified schedule of Sharma and Sen[11]. The antigen used for immunodiffusion tests were subjected to repeated freezing and thawing.

With its homologous antiserum, *A. nidulans* ARM 336 developed two precipitin bands—a slow diffusible band of somatic antigen and a fast diffusible band of internal (intracellular) antigen. *Synechococcus* ARM 343 (Fig. 1 A, *b*), *S. cedrorum* ARM 337 (Fig. 1 C, *e*) and *S. elongatus* ARM 345 (Fig. 1 B, *c*) also showed homology with respect to the two bands, although *S. cedrorum* ARM 337 showed an additional band of somatic antigen. *S. cedrorum* ARM 344 (Fig. 1 C, *f*) showed identity with *A. nidulans* with respect to the internal antigen only.

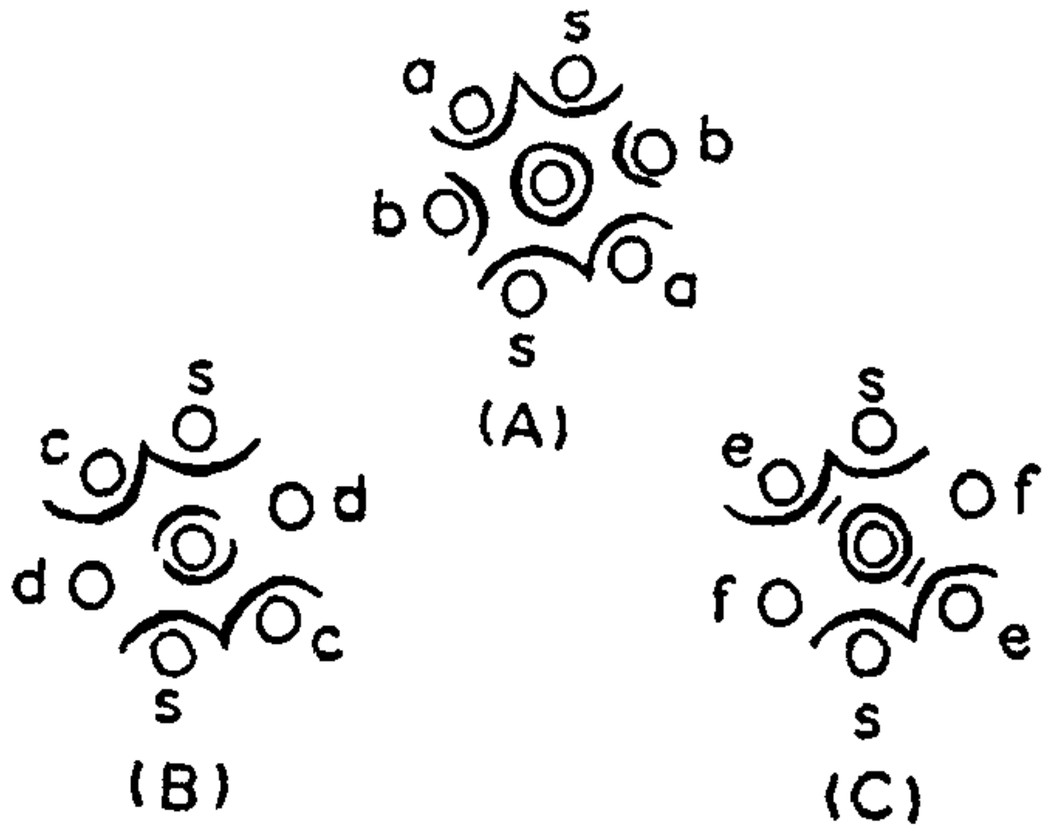

FIG. 1. A-C. Immune diffusion pattern of different algae. A, S, *Anacystis nidulans* (standard); *a*, *Aphanocapsa* sp. ARM 341; *b*, *Synechococcus* sp. ARM 343; B, *c*, *S. elongatus* ARM 345; *d*, *Chroococcus minor* ARM 339; C, *e*, *S. cedrorum* ARM 337; *f*, *S. cedrorum* ARM 344.

The culture labelled as *Aphanocapsa* ARM 341 (Fig. 1 A, *a*) showed perfect homology to *A. nidulans* with respect to the somatic and internal antigens, indicating the generic identity of the two. Microscopic examination also confirmed that ARM 341 was in reality *Anacystis*. The complete identity with respect to the internal antigens and the complete or partial identity with respect to somatic antigens between *Anacystis* and *Synechococcus* spp. suggest their generic relatedness and lend support to the merger of the two by Padmaja and Desikachary[9]. The variations in the somatic antigen bands indicate of strain variations.

Aphanocapsa ARM 5, *Gloeocapsa* ARM 338, *Chroococcus minor* ARM 339, *Chlorogloea fritschii* ARM 342, *Spirulina platensis* ARM 346. *Lyngbya* sp. ARM 348 and the green alga *Chlorella vulgaris* ARC 3 showed no cross-reaction with *Anacystis nidulans* indicating their widely different antigenic constitution.

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TABLE I

Designation and history of algal strains

IARI No.	Designation of the strain	Isolator	Strain history
ARM 336	*Anacystis nidulans* 1402–1	Myers	→ SAUG[a] → IARI[f], 1969
ARM 337	*Synechococcus cedrorum* IUCC 1911	Gassner	→ UBL[b] → IARI[f], 1978
ARM 344	*S. cedrorum* IUCC 1911	Gassner	→ BCC[c] → MMU[d] → IARI[f], 1978
ARM 345	*S. elongatus* IUCC 563	Pringsheim	→ BCC[a] → MMU[d] → IARI[f], 1978
ARM 343	*Synechococcus* sp. 6301	Rippka	→ MMU[d] → IARI[f], 1978
ARM 340	*Synechocystis* sp. 68/36		→ UBL[b] → IARI[f], 1978
ARM 341	*Aphanocapsa* sp.		→ MMU[d] → IARI[f], 1978
ARM 5	*Aphanocapsa* sp.	Venkataraman	→ IARI[f], 1963
ARM 338	*Gloeocapsa* sp. IUCC 795	Markle	→ IUCC[e], → UBL[b] → IARI[f], 1978
ARM 339	*Chroococcus minor* 19591	Fott	→ UBL[b] → IARI[f], 1978
ARM 342	*Chlorogloea fritschii*	Mitra	→ SAUG[a] → MMU[d] → IARI[f], 1978
ARM 346	*Spirulina platensis*	R. Fox	→ IARI[f], 1973
ARM 348	*Lyngbya* sp.	Kaushik	→ IARI[f], 1977
ARC 3	*Chlorella vulgaris*	Venkataraman	→ IARI[f], 1964

[a] Sammlung von Algenkulturen der Universität Göttingen.
[b] University Botany Laboratory, Madras.
[c] Berkley Culture Collection.
[d] Department of Microbiology, Madurai University.
[e] Indiana University Culture Collection.
[f] Indian Agricultural Research Institute.

TABLE II

Comparison of the characters of algal forms

Class and Genus	Cell shape	Plane of division	Sheath	Slime layers	Gas vacuoles	Thallus structure
MYXOPHYCEAE						
Anacystis	Cylindrical	1	–	–	–	Cells single or two; never forms colonies.
Chroococcus	Spherical or subspherical, or hemispherical	2 or 3	+	Variable	–	Groups of 2–4 individuals, sometimes 8–16, rarely single; nannocytes ocasionally present.
Gloeocapsa	Spherical	3	+	Variable	–	2–8 cells in colonies, seldom many with a number of concentric envelopes; colonies single or many together forming an expanded mass; nannocytes present.
Aphanocapsa	Spherical or nearly so	2 or 3	–	+	–	Many cells in a slime layer; nannocytes present in some species.
Synechococcus	Cylindrical or ellipsoidal	1	–	–	–	Cells single or two; never forms colonies.
Synechocystis	Spherical	1	–	Variable	–	Cells single or two together after division or rarely in colonies of a few cells.
Chlorogloea	Spherical or ellipsoidal	(1–) 3	+	–	–	Irregularly lobed thalli with tightly packed groups of cells; heterocyst present· gonidia and nannocytes present.
Spirulina	Trichomatous unicellular or multicellular, cylindrical	1	–	–	+	Spiral filaments.
Lyngbya	Trichomatous, trichomes single	1	+	–	+	Unbranched or very seldom branched filaments.
CHLOROPHYCEAE						
Chlorella	Spherical	multiple	–	–	–	Unicellular, reproduces by autospores.

University, Madurai, Dr. A. Anand, University Botany Laboratory, Madras, and Dr. (Mrs.) P. Roychoudhury, Culture Collection of Microalgae, Division of Microbiology, I.A.R.I., New Delhi, for supplying the algal cultures.

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A NEW SPECIES OF *MYCOVELLOSIELLA* FROM INDIA

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THE genus *Mycovellosiella* was established by Rangel with *M. cajani* (P. Henn.) Rangel ex. Trotter as the type species (Muntanola[1]). Recently during their mycological collections of Gorakhpur region, authors have collected a fungus on *Hymenodictyon excelsum* Wall, which was found to be an undescribed species of *Mycovellosiella.*

The detailed studies carried out on the morphology of this fungus, in comparison with the earlier known species (Deighton[2], Ellis[3,4] Shaw and Deighton[5], Sutton[6]) show that the present fungus comes close to *M. triumfetteae* Deighton (Deighton[2]), but differs from it in having less number of septa and smaller size of narrower conidia; hence it is described as a new species.

Mycovelosiella gorakhpurensis sp. nov.

Contagionis maculae amphigenae, enormes, effusae, rubrobrunneae; Coloniae hypophyllae; mycelium partim immersis partim superficialibus, septatis, ramosis, hyalinis vel subhyalinis, principale immersis, septatis, hyalinis, ramosis, secondarium septatis, subhyalinis, levibus, ramosis, per stomata emergentibus, primo super folii superficiem repentibus, deinde succrescentibus, compositum; conidiophora semimacronemata mononemata, ex apice vel latere hypharum superficialium ramorum orta, ramosa, recta vel flexuosa, levia, intertexta, pallide brunnea, longitudine varia, 2·7–4·5 μm diametro; cellulae conidiogenae integratae, polyblasticae, plerumoue terminales, nonnumquam intercalares, sympodiales, cylindicae, cicatricibus manifeste incrassatis notatae; conidia singularia, acropleurogena, raro catenata, pallide olivacea, simplicia, levia, cylindrica vel obclavata, basi truncata, apice obtuso, plerumque recta, raro leviter arcuata, 3-7-septata, ad septa leviter constricta, 23–60 μm longa, ad 3·7 μm crassa.

In foliis vivis *Hymenodictyi excelsi* Wall. Rubiacearum, Gorakhpur, m. Feb. 1978, leg. P. Kumar 202, IMI 228146, typum.

Infection spots amphigenous, irregular, effuse, reddish brown colonies hypophyllous, mycelium partly immersed and partly superficial, septate, branched, hyaline to subhyaline, primary mycelium immersed, septate, hyaline, branched; secondary mycelium septate, subhyaline, smooth, branched, emerging through the stomata, at first repent over the leaf surface and then growing upwards; conidiophores semimacronematous, mononematous, arising laterally or terminally from the branches of the superficial hyphae, branched, straight or flexuous, smooth, intertwining, light brown, variable in length, 2·7–4·5 μm wide; conidiogenous cells integrated, polyblastic, usually terminal, sometimes intercalary, sympodial, cylindrical, cicatrized, with conspicuously thickened scars; conidia solitary, acropleurogenous, rarely catenate, pale olive, simple, smooth, cylindrical to obclavate, with truncate base and obtuse apex, mostly straight, rarely slightly curved, 3-7 septate, slightly constricted at the septa, 23–60 × up to 3·7 μm (Fig. 1 *a*, *b*).

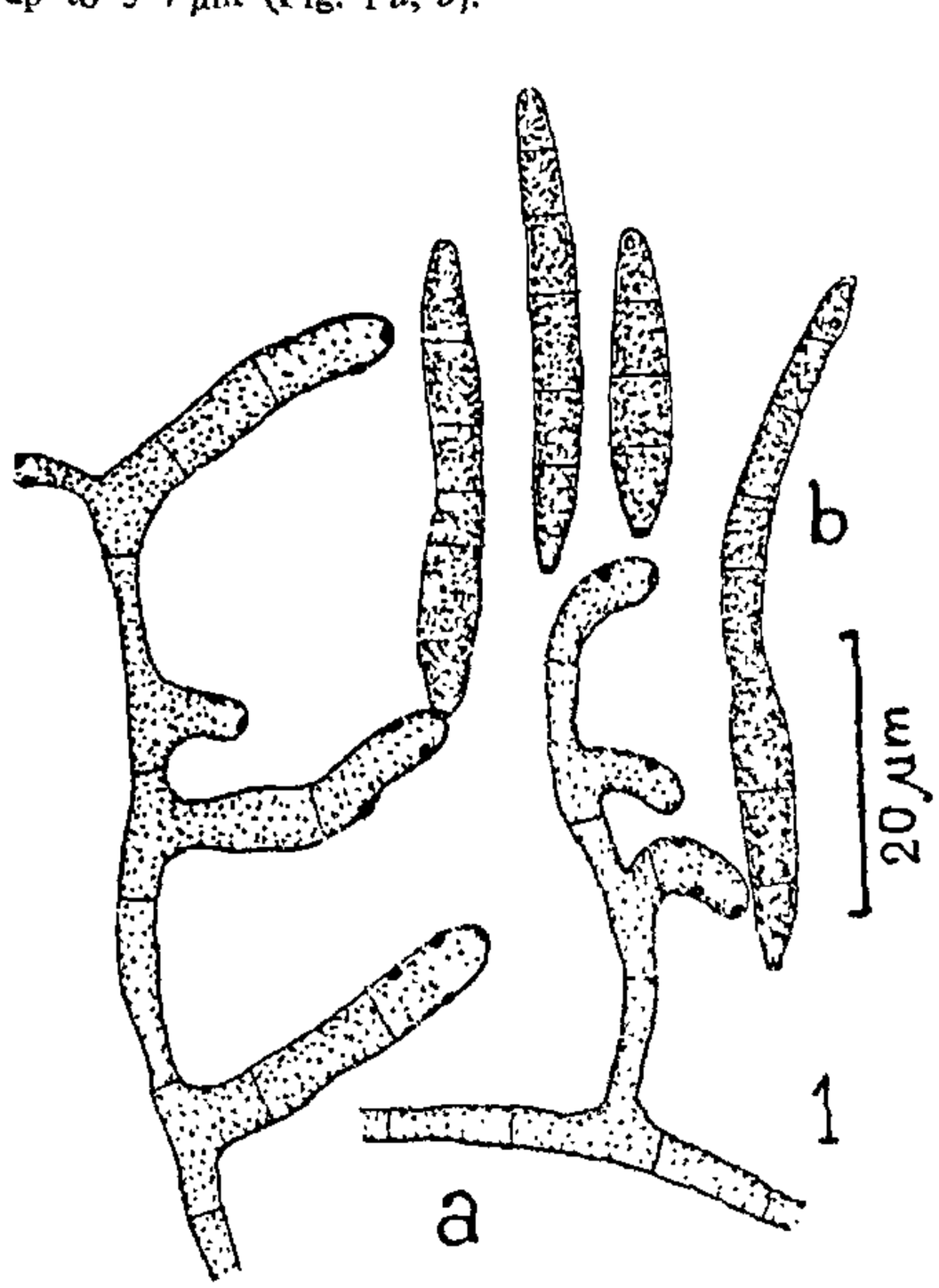

FIG. 1. *Mycovellosiella gorakhpurensis.* (*a*) Conidiophores; (*b*) Conidia.