A NEW LEAF SPOT DISEASE OF CHILLIES

A SERIOUS leaf spot disease of chillies cultivar NP-46A was observed during July–October season in 1976 and 1977 at the Indian Institute of Horticultural Research Experimental Farm, Hessarghatta (Bangalore). The disease first makes its appearance as small, oval to irregular, light brown spots near the margin of leaf lamina. These spots later turn dark brown to black in colour and in advanced stages several spots coalesce and result in defoliation. In some cases irregular, brown to black spots can also be observed on petioles, small branches and fruit stalks. Repeated isolations made on potato dextrose agar (PDA) medium by routine pathological techniques revealed the association of *Curvularia* sp. with this disease.

The pathogenicity of the fungus was confirmed by spraying conidial suspension on injured and uninjured leaves of two months old seedlings of cultivar NP-46A. Inoculated leaves developed the characteristic symptoms within 5–9 days. The pathogen was re-isolated from these artificially infected leaves and found identical with the original fungus isolated directly from the host. Cultivars NP-46A, Jwala, G_3 and G_5 were found equally susceptible to the disease.

The pathogen on PDA produces light brown to dark brown colonies with abundant sporulation in 7 to 11 days. Hyphae were dark brown, septate and 2–5 μm wide. Conidiophores dark brown, unbranched, septate towards the tip, 3–5 μm wide. Conidia boat-shaped, brown, 3–4 celled; the third cell from the base conspicuously larger, broader and darker than others, 17–32 μm long and 7 to 17 μm wide. The culture was identified as *Cultivaria* state of *Cochliobolus lunatus* Nelson and Haasis by CMI, Kew, Surrey, England and deposited under IMI No. 206064.

Curvularia lunata (Wakker) Boedijn has been reported to cause leaf spots in banana[1], rose[3], guar[2], brinjal[9], mango[6], tomato, soybean, sapota and cotton[4] in India. *C. ovoidea*[7,8] and *C. senegalensis*[5] have been reported on chillies but *C. lunata* is a new record on this host.

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METHANOGENIC ORGANISMS FROM FERMENTING SLURRY OF THE GOBAR GAS PLANT

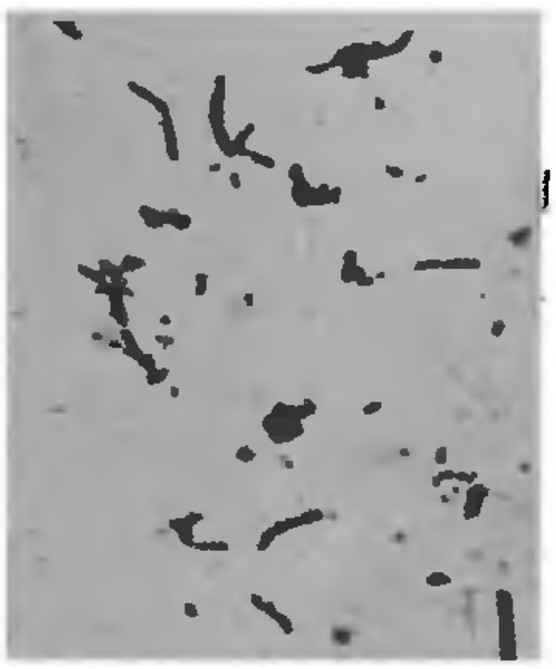
GOBAR gas has gained considerable importance in these days of energy crisis. Although gobar gas activity has become popular in India during the last two decades, there is hardly any report on the micro-organisms involved in the production of biogas. The present report gives an account of the methanogenic organisms isolated from the fermenting slurry of the gobar gas plant.

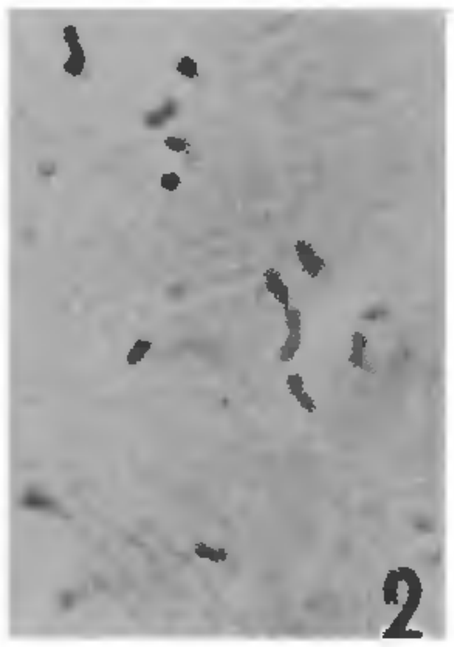
Isolations were made after initial enrichment of the samples in Smith and Hungate's medium[1] and Zeikus' medium[2] with cysteine hydrochloride as a reducing agent and 0·5% sodium formate as a supplementary substrate. In Smith and Hungate's medium the clarified rumen fluid was replaced with the clarified digester fluid. Subsequent isolations of the methanogenic organisms from the enriched samples were made by employing Miller and Wolin's serum bottle modification of Hungate's technique[3–5] using Zeikus' medium and $H_2 : CO_2$ (80 : 20) as the gas phase and also as the substrate. Since the methanogenic organisms are strictly anaerobic in nature, the environment was kept oxygen free by using gases like hydrogen, nitrogen, carbon dioxide, etc., after passing them over heated (300–350°C) copper column to absorb residual oxygen present in the gases. The rolled bottles were incubated at 37°C for 30 days with intermittent equilibration of gas phase after every two days' interval and examination of gas samples in the bottles for the presence of methane on gas chromatograph. [Column– porapak Q, detector—thermal conductivity detector, carrier gas—hydrogen (40 ml/min) room temperature]. The isolated colonies on the inside wall of the bottles were further studied for their gross morphology by Gram staining[6], motility and flagella staining[7], various physiological charac-

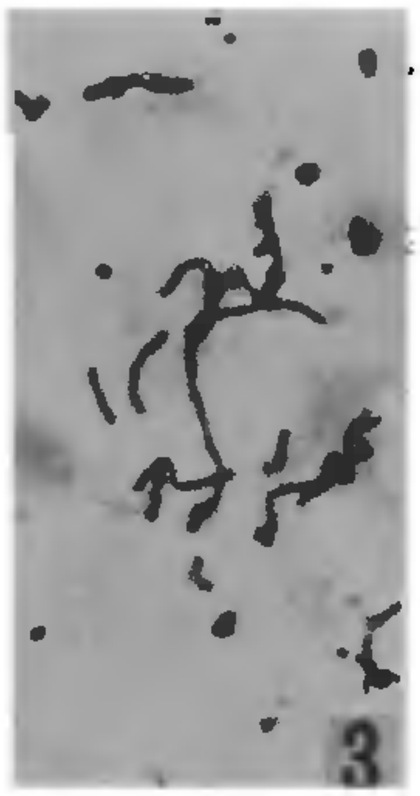
TABLE I

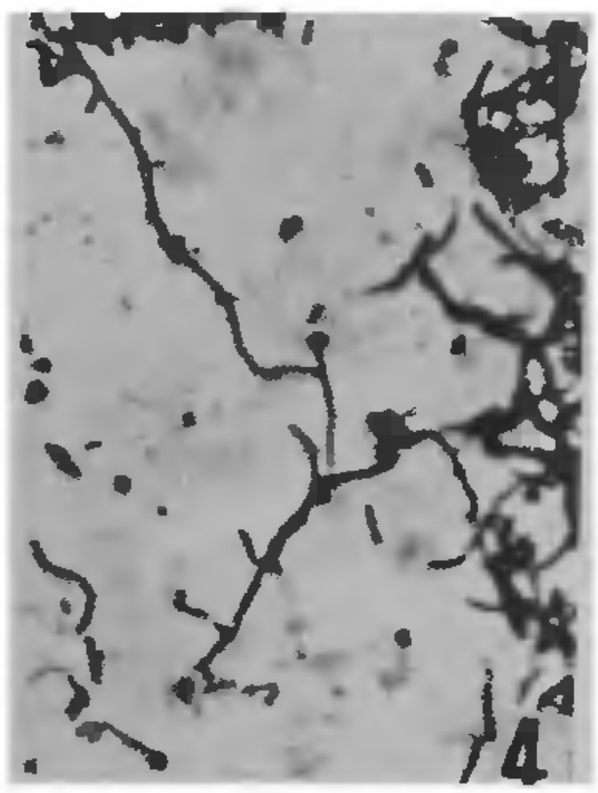
Important characteristics of the Methanogenic Organisms isolated from the cattle dung fermenting slurry

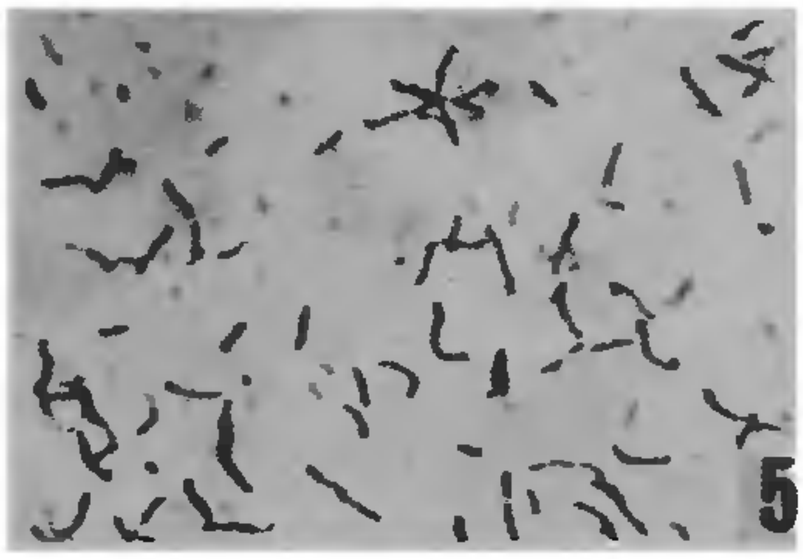
Microorganisms	Isolate Nos.	Colony characteristics	Morphological characteristics	Substrate utilization	Temperature		pH		Sensitivity to exposure to oxygen
					Optimum °C	Range °C	Optimum	Range	
Methanobacterium mobile	1	Circular, 1 mm in diam., smooth entire margin, colouress to pale yellow	Gram negative, short rods, straight or slightly curved 1·5–2·0 × 0 7 μm, Motile-single polar flagellum.	$H_2 + CO_2$ Sodium formate	40	30–45	7·1	6·1–8·0	30 mins
Methanobacterium ruminantium	2 and 8	Circular, 2–3 mm in diam., smooth, entire margin, cream white.	Gram positive, short rods, singly or in chains of 3–5 cells, 0·5–2·0 × 0·8–0 9 μm, non motile.	$H_2 + CO_2$ Sodium formate	37	25–45	7·5	6·1–8·0	5 mins.
Methanobacterium formicicum	3,5,7 and 9	Circular or spheroidal, 2–4 mm in diam., rough, filamentous margin, white.	Gram varjable, short filamentous rods, straight or irregularly curved, singly or in chains of 3–5 cells, 2–10 × 0·5–0·7 μm, non motile.	$H_2 + CO_2$ Sodium formate	37	25–45	7·1	6·1–8·4	15 to 30 mins.
Methanospirillum hungatii	6	Circular, 2 mm in diam., rough, diffuse margin, white to light blue.	Gram negative, slender filamentous rods spirillum like, 5·45 × 0·7 μm, weakly motile-single polar flagellum.	$H_2 + CO_2$ Sodium formate	40	30–45	7·1	6·1–8·0	8 hrs.
Methanobacterium sp.	4	Circular, 1 mm in diam., smooth, entire margin, yellow to brown.	Gram positive, short or long rods, pleomorphism observed, cells aggregate to form rosettes 1–5 × 0·5–0·7 μm, nonomtile.	$H_2 + CO_2$ Sodium formate	37	25–45	7·5	6·1–8·4	60 hrs.











FIGS. 1–5. Morphological characters of methanogenic organisms isolated from the cattle dung fermenting slurry. Fig. 1. *Methanobacterium mobile*, Fig. 2. *M. ruminantium*, Fig. 3. *M. formicicum*, Fig. 4. *Methanospirillum hungatii*, Fig. 5. *Methanobacterium* sp.

teristics like substrate utilization, effect of reducing agents, organic complexes, temperature, pH and oxygen on production of methane[8]. Final identification of the isolates was made based on Bergery's Manual for the Determinative Bacteriology[9], Zehnder and Wuhrmann[10] and Patel *et al.*[11]

A total number of nine isolates were obtained from six samples of the cattle dung fermenting slurry. The cultural morphological and physiological characteristics of 8 isolates showed that they resembled 4 methanogenic species included in two genera as detailed in Table I and Figs. 1 to 4. Isolate No. 4 could not be identified to the species level (Fig. 5).

If one takes into consideration the frequency of isolations of the methanogenic bacteria, it becomes evident that *M. formicicum* isolated from four samples out of six examined, is the most prominent in the cattle dung fermenting slurry followed by *M. ruminantium* isolated from two samples and *M. mobile*, *Methanobacterium* sp. and *Methanospirillum hungatii* isolated from one sample each.

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A NEW COLLAR ROT DISEASE OF CASTOR FROM INDIA

CASTOR (*Ricinus communis* L.) is one of the important oilseed crops in India. The authors observed some of the wilted castor seedlings in the experimental plots on the Farm, College of Agriculture, Dharwar. The affected plants showed wilting followed by drying resulting in the death of the seedlings. Close observations on infected plants revealed white mycelial mat along with sclerotial bodies, covered at the collar