infestation brings down the yield of mustard to an extent of about 70·2 to 91·3%[2-4], the different grades of seed weight represent the various extent of aphid damage. Table II shows that the seed weight has a direct bearing on chemical composition. In oil yielding crops like mustard bolder and heavier seeds contain more oil. Such direct correlation of seed size and oil content has been known in brown sarson[5]. Viability of seeds is also dependent on seed size. Non-significant variation in iodine value of the oil of different grades suggests that the percentage of unsaturated fatty acids has not been altered due to infestation. The smaller seeds having large proportion of seed coat, rich in fibre, account for their higher ash as well as total sugar content than their bolder counterparts. Allyl isothiocyanate which is known to be a specific substance giving stimulus for host selection by aphid[6], has been increased in the lighter seeds, with a corresponding increase in the total sugar content.

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A NEW BACTERIAL BLIGHT DISEASE OF *MURRAYA KOENIGII* SPRENG.

Murraya koenigii Spreng., a member of the *Rutaceae*, is commonly grown in private gardens in western India. In September–October of 1973, a blight disease was noticed on this plant at Bhavnagar, Gujarat State.

The disease at first appears on first formed leaves as numerous, irregular, water soaked, brown to black spots mostly on the margin, measuring from 1 to 2 mm in diameter. In severe cases, the pathogen attacked the entire leaf causing blighting of it.

The causal bacterium was isolated in pure culture on potato dextrose agar by usual pour plate and streak plate methods. On artificial inoculation of young and mature plants of *M. koenigii*, the typical symptoms developed in about fifteen days (Fig. 1). The pathogen was reisolated in pure culture and identified with the original.

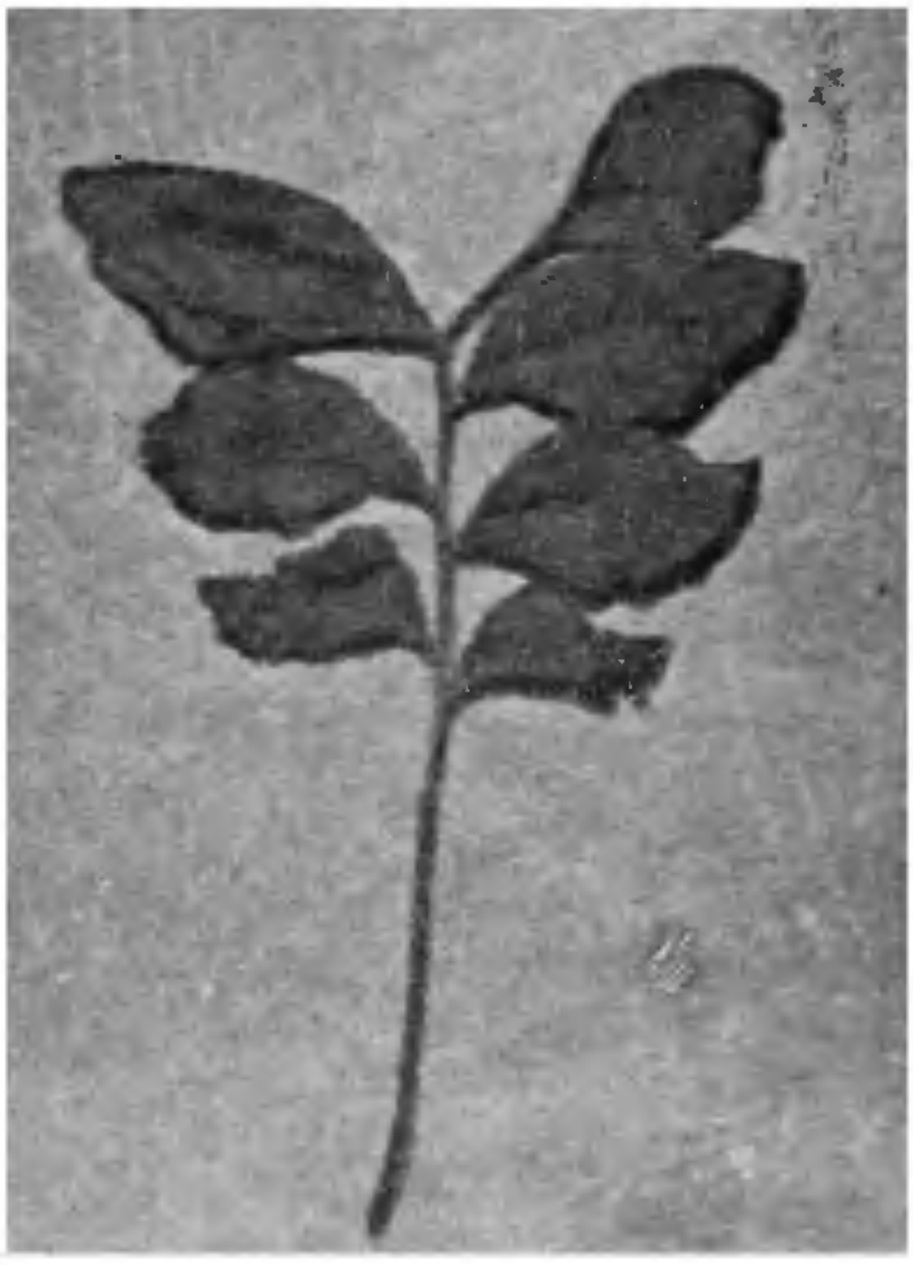

FIG. 1. Symptoms on leaves from artificially inoculated mature plants.

By artificial inoculation, the bacterium could not infect *Tamarindus indica* L., *Triticum vulgare* H., *Capsicum annuum* L., *Bantinia recemosa* L., *Gossypium* spp., *Lawsonia alba* L., *Sorghum vulgare* P., *Carissa carandus* L., *Phascolus* spp., *Citrus* spp., while infect the second member of the *Murraya* genus, *M. exotica* within twenty-five days.

The morphological, cultural and physiological characteristics of the pathogen showed it to belong to the genus *Xanthomonas*.

Since no *Xanthomonas* disease is reported from the host from anywhere and as host-specificity is considered as accepted criterion for speciation in the *genus Xanthomonas*[1-3], it is, therefore, propsed to designate the pathogen as *Xanthomonas murrayae* nov. sp. The technical description of the pathogen is as follows :

Xathomonas murrayae Nov. Sp.

Short rods with rounded ends, usually single, rarely in pair, measuring 1–1·9 × 0·5–0·8 microns, gram-negative, motile with polar flagellum, capsulated, no endospore, non-acidfast, colonies on

PDA plate—big, circular, smooth surface and entire margin, butyrous and glistening yellow. Growth on PDA slant is abundant, filiform, convex, smooth opaque, butyrous and glistening yellow, the medium remains unchanged. On nutrient agar growth is moderate, filiform, flat, smooth, opaque and glistening yellow.

Starch hydrolyzed, casein digested, tributyrin hydrolyzed, gelatin liquefied, milk peptonised and litmus reduced, ammonia and hydrogen sulfide produced, indole not produced, V.P. and M.R. tests negative, nitrate not reduced to nitrite, uric acid utilized but not citrate, growth retarded by 2% and suppressed by 3% sodium chloride. Produce acid without gas from glucose, sucrose, galactose, xylose, fructose, ribose, mannitol, glycogen but no acid and gas from lactose, rhamnose, inositol and inulin. Catalase positive, strictly aerobic, optimum temperature 27°–30° C, thermal death point 55° C.

The bacterium is pathogenic only to *Murraya* plants producing blighting of leaves.

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THE OCCURRENCE OF RACE 5 OF *XANTHOMONAS MALVACEARUM* IN INDIA

SEVENTEEN physiologic races have been distinguished in the pathogen of the bacterial blight of cotton, *Xanthomonas malvacearum* (E.F.Sm.) Dows.[1,2]. Of these, five, *viz.*, races 3, 10, 14, 16 and 17 have been reported to be present in India. Race 10 is ubiquitous and occurs in all parts of India wherever cotton is grown. Recently while examining collections of the pathogen occurring on different varieties in the germplasm, one isolate purified out of a mixture occurring on variety PRS 72 was pathogenic to Acala 44, Stoneville 2B–S9, 1–10 B and 20–3 but did not affect the other differential varieties of Hunter *et al.*[1]. This isolate thus corresponds to race 5 described by these authors. It has been found to be highly pathogenic and to affect a wide range of varieties belonging to *Gossypium barbadense* and *G. hirsutum* including Sujata, MCU-1, MCU-5, Laxmi and PLD-40.

A synergistic effect was observed between race 5 and race 10. While the two races when inoculated separately on leaves of variety Laxmi gave rise to angular leaf spots which were 3 to 5 mm across, a mixed inoculum containing approximately equal number of bacterial cells per unit volume of inoculum fluid gave rise to angular spots which were 6 to 9 mm in diameter. In addition, the spots appeared about two to three days earlier with the mixed inoculum, *i.e.*, after 8 days while the inocula of the two races used separately gave rise to spots after 10 to 11 days. However there was no increase in the number of spots. Similar results were obtained by introducing the inoculum into the veins or petioles or vascular elements of young plants, either by injecting with a hypodermic syringe or by pricking with a fine needle through a drop of the bacterial suspension placed on the surface by means of a fine nylon headed steel entomological pin. The linear vein lesions in this case appeared 10–11 days after inoculation and were 10–14 mm long with the pure races, but appeared after 8 days and the lesions were 20 to 23 mm long with a mixed inoculum.

Comparable results were obtained with varieties MCU-5 (*G. hirsutum*) and Sujata (*G. barbadense*). However both the individual races and a mixture could bring about only small lesions (Grade 2) on variety K-7 (*G. arboreum*), and they could not infect other known resistant varieties like 101–102B, BJA 592, *P.14–T.128* and Reba-B-50.

It would appear that in epiphytotic years when cotton crops suffer severe damage, such mixtures of races possessing synergistic virulence may be involved. The occurrence of this phenomenon will also complicate the task of breeding for bacterial blight resistance.

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