

The temperature of the water-bath was kept at an uniform temperature of 30° C. for all the observations.

The data obtained in the investigation and meteorological observations are presented in the table.

TABLE

Observations on 4-10-1947 (The experiment was repeated on another Sunny day and more or less similar data were obtained)

Time	Shade temperature °C.	Light	Catalase activity Oxygen liberated in c.c.		Ratio : catalase activity of leaves/catalase activity of petals
			Petals (mean of three findings)	Leaves	
Morning 7.00-8.00	28.6	Bright sunlight	6.00	21.56	3.6
Noon 12.00-1.00	31.0	Intense sunlight	6.43	15.16	2.4
Evening 7.30-8.30	30.0	Dark	14.30	16.60	1.2

From the data it is clear that the catalase activity of the petals are less than the leaves. In case of the petals the catalase activity slightly increases in the noon but a sharp rise is obtained in the evening, when the flowers have started to fade. In case of the leaves, the results obtained for catalase activity are different. In leaves the catalase activity is high in the morning and the values obtained in the noon and the evening are comparatively low. The results obtained are interesting but further study is necessary before any explanation can be offered with reasonable accuracy.

My thanks are due to Principal Das, B.A. (Lond.), for the facilities provided for this work in the Sambalpur College and his valuable encouragement.

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March 3, 1949.

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1. Appleman, C. O., *Bot. Gaz.*, 1910, 50, 182.
2. Pattanaik, S. N., *Curr. Sci.*, 1946, 15, 196-97.

XANTHOMONAS DESMODII, A NEW
BACTERIAL LEAF-SPOT OF
DESMODIUM DIFFUSUM DC.

THE disease appears as yellowish brown, water-soaked, angular spots on the underside of leaves of *D. diffusum* used sometimes for green manuring at Poona. The pathogene differs from other bacterial leaf-spots of legumes in several respects and therefore it is proposed to assign it a specific rank *Xanthomonas desmodii* Uppal & Patel sp. nov.

Short rods with rounded ends, single or in pairs but never in chains; motile with a polar flagellum; capsule absent; no spores, no involution forms and non-acid fast; Gram negative; strict-aerobe; stains readily with common dyes. Colonies on neutral potato dextrose agar round, viscid, smooth, shining, wet, amber yellow with colourless margins and no internal markings. Excellent butyrous growth on potato cylinders and potato dextrose agar slants; odour is absent. Optimum temperature for growth lies between 25° and 30° C., maximum 38° C., minimum 11° C., while thermal death temperature about 50° C. Gelatin liquefied; starch hydrolysed; casein digested; litmus in milk reduced; milk peptonised; slight hydrogen sulphide produced. Ammonia and nitrites not produced; asparagine not utilised; blood serum not liquefied; no growth in Fermi's, Uschinsky's and Cohn's solutions. Acid but no gas in dextrose, galactose, lactose, mannite, maltose and sucrose; poor growth in salicin, arabinose, xylose, dulcitol, glycerol, raffinose and levulose.

Pathogenic only to *D. diffusum*, producing angular, yellowish brown leaf-spots and sometimes causing defoliation.

A detailed paper is being published elsewhere.

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March 28, 1949.

M. K. PATEL.

TRIALS OF U.S.A. HYBRID CORN
(MAIZE)

IN 1947-48, 7¾ million acres were under cultivation of corn (maize) in India. Our estimated total yield was a little over two million tons, but 20% short of the demand, and 400,000 tons had to be imported from abroad. Our average yield in 1947 was

8 maunds per acre, which is $1\frac{1}{2}$ maunds lower than the average yield per acre obtained during 1936-40. In the United States of America, during the corresponding period, the average yield per acre increased from 16 maunds (1930-34) to 25.3 maunds in 1946. This increase was achieved by the use of hybrid corn seeds. In 1933, hybrid corn seeds were sown in only one acre out of a thousand; but by 1945, 675 acres out of a thousand were planted with hybrid corn. In that year, the increase of yield in the United States of America was some 17 million tons. Translated into increased income to the farmers, this meant 700 million dollars.

There are several research schemes on maize which have been sanctioned by the Indian Council of Agricultural Research, but it will take several years of co-ordinated work to evolve our own strains of hybrid corn suited to the different climatic regions of India. Experiments have recently been undertaken in this Laboratory to find out whether some strains of U.S.A. double cross hybrids could be utilised in India for increasing our yield of maize. Through the courtesy of Dr. Merle T. Jenkins, Washington, D.C., seeds were obtained for these experiments with three double crosses of hybrid corn (U.S. 13, Iowa 306 and Minhybrid 404), single cross parents of 306 and the inbred parents of all these strains.

Three sowings were undertaken at Almora on: (i) June 1st, (ii) June 25th, and (iii) June 28th, 1948.

In all these sowings the different strains of corn were planted in single rows 15 ft. long. The distance between plants was 18". The distance between rows varied according to the area available: $2\frac{3}{4}$ ft. in (i) and (ii) and 3 ft. in (iii).

In the first two sowings at Almora, 12 strains of U.S.A. inbred parents, 2 single and three double crosses, open pollinated U.P. T. 41 and Almora local strain were sown, and in the third sowing three strains of U.S. double cross hybrids, T. 41 and one Almora local strain were sown in five replications.

Despite four sowings, one each of the four inbred parents of the double crosses did not germinate, and therefore only one single cross parent each of three double crosses was produced. The single cross parents of Iowa produced vigorous plants

giving high yield of double cross hybrid seeds. The photograph, Fig. 1, shows the vigour of the single cross parents of Iowa 306, numbered 5 (AB) and 6 (CD), and a cob of 5 being pollinated by the tassel of 6.



FIG. 1. Photograph of single cross parent plants of Iowa. $\times 306$.

The average number of days required for emergence of tassel and silk in different strains of corn is given below (see Table).

It will be seen that the Almora variety was the earliest, but the life-cycles of the U.S. hybrid strains were shorter than that of U.P. T. 41.

TABLE I

Strain	Almora	Minhybrid 404	U.S. 13	Iowa 306	T. 41
Tassel ..	42.14	52.33	55.61	55.87	58.98
Silk ..	51.73	58.62	62.73	61.76	65.60

The average yield per plant of different strains is given in Table II (A), and the average yield per plot is given in Table II (B).

TABLE II

(A) Average yield per plant

Strain	U.S. 13	U.S. 306	T. 41	U.S. 404	Almora
Av. yield	9.09 oz.	6.73 oz.	3.91 oz.	3.01 oz.	0.77 oz.
	C.D.=0.80				

(B) Average yield per plot

Strain	U.S. 13	U.S. 306	T. 41	U.S. 404	Almora
Av. yield	82.75 oz.	54.62 oz.	32.32 oz.	24.03 oz.	4.16 oz.
	C.D.=8.15				

It will be seen that, compared to Almora local strain, the yield from all the other strains was far greater—U.P. T. 41 gave 407% and U.S. 13, 1080% higher yield. Compared to T.41, the observed yield of U.S. 404 was 23% less, but that of the other two U.S. hybrids was higher—U.S. 306, 76% higher, and U.S. 13, 132% higher. Fig. 2 reproducing mature cobs graphically shows this marked difference.

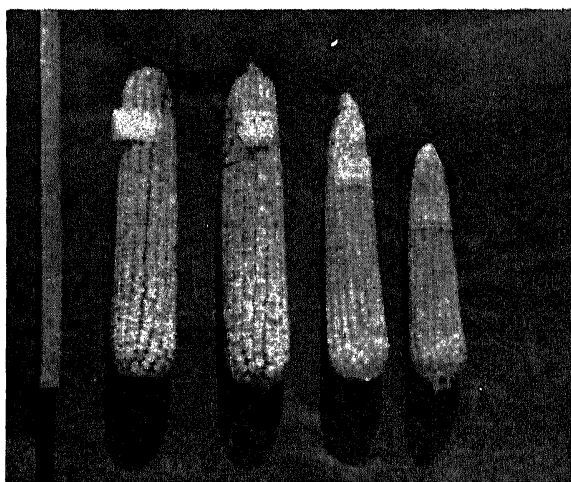


FIG. 2. Photograph of cobs of different strains of corn.

From left to right :—(i) U.S. 13; (ii) Iowa 306; (iii) U.P. T. 41; (iv) Almora local.

In view of the very high yield of the two strains of U.S. double cross hybrid corn

observed in Almora, further experimental sowings with different strains of U.S. hybrid corn should immediately be undertaken throughout India, to find out types suitable for different regions. If positive results are obtained, we could more than make up our 20% deficit in corn production by the use of hybrid seeds, without increasing our corn acreage.

In the field work efficient help was rendered by Shri. Bansilal Sah and Shri. Udinath. The data were kindly analysed by Shri. A. R. Roy, Statistician (A.H.), I.C.A.R., New Delhi. The expenses of this work were met from a grant from the Department of Agriculture, United Provinces.

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March 30, 1949.

B. SEN.

CULTURING OF PRO-EMBRYOS OF NORMAL DIPLOID CORN (MAIZE) AGED 3 TO 7 DAYS

HAAGEN-SMIT and others (1945) who worked on corn reported that 10 day-old corn embryos over 3 mm. in length grew steadily in the culture medium. They, however, did not indicate the reaction in a culture medium of a pro-embryo less than 10 days old. In a younger kernel, the size of the embryo, it may be noted, is proportionately smaller. Further, it has been observed by previous workers, that as the size of the pro-embryo became smaller, there was a corresponding diminution in its response to the culture medium, even if the embryos were of the same age. Corn kernels collected 3 days after pollination were dissected under a dissection microscope. The seed was disinfected by dipping in S. T. 37 diluted 1:1 with water. The slide upon which the dissection was made and the forceps and the needles used for the dissection were all dipped in 70% ethanol and then passed over a flame before use. The method adopted by Haagen-Smit for dissecting the embryo consisted of holding the kernel between two slides, then cutting with a razor blade, and finally lifting the embryo out with a dissecting needle. The dissection had to be done under a dissection microscope as the embryo in this case was much younger and could not be located with the naked eye. The size of the embryo measured 70 microns in length and