

complements of the parental species cannot be ruled out. During anaphasic separation, by and large, equal distribution of chromosomes to the poles was recorded, except in a few cells, where 1–3 laggards (figure 6) were noticed. Pollen stainability in F_1 was 64% and ranged from 56.2% to 91.8% in the F_2 plants (table 2).

In contrast to the viny growth habit of seed parent and erect habit of pollen parent some of the F_2 plants showed semierect and spreading growth habits. In some of the F_2 segregants increase in fertility and chromosomal pairing could possibly be due to the existence of close homology in their chromosomal complements. Tripathi and Patil¹ reported increase in the chromosomal pairing/fertility in some of the F_2 segregants of the cross between *A. albicans* and *A. scarabaeoides*.

Apart from trifoliate leaves, bifoliate and quadri-foliate leaves were also noticed on some of the branches of F_2 plant (figure 7). The variation in leaf morphology could possibly be due to consequence of differential gene expression in different branches.

The wild relatives of crop species have been suggested as possible source of high protein in *Avena sterilis*^{2,3}, *Vicia narbonensis*⁴ and *A. albicans*⁵. Thus, the possibility exists in isolating some of the highly nutritive cultivar in onward generation on one hand and the variabilities in morphological characters open scope for breeding new plant types, on the other.

1 July 1987; Revised 21 September 1987

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CONTACT ELECTRON MICROGRAPHY FOR CHARACTERIZATION OF PAPER : A NEW TECHNIQUE

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WE describe here some preliminary results and the details of a simple technique, abstracted earlier¹ for photographically recording a contact electron micrograph of thin paper and film materials using the conventional plate camera system of a transmission electron microscope (Philips EM-300).

Sheets of standard filter papers in various porosity grades, and other types of papers were cut to photographic cut sheets (8.3×10.2 cm) after ensuring that the specimen did not bend or fold during cutting. The specimen, one each was held in position over the emulsion of photographic cut film in the dark room, and slid together into the groove guide of the film holder, keeping the specimen on top. A suitable packing (cardboard or discarded cut film) was provided below the recording film, to hold its emulsion in tight contact with the specimen.

With objective lens current set to a minimum value at 80 kV acceleration potential, the second condenser lens current was so adjusted to have the objective aperture (thin gold foil self-cleaning) enlarged equal to the outer diameter of the circular fluorescent screen of the plate camera. In other words, the effective divergence of the electrons from the objective aperture was kept lowest for their near normal incidence on the specimen. Exposures (1 and 2 sec in this case) were pre-calibrated for each kind of specimen paper and recorded using the half masking facility.

Figures 1 and 2 show the contact electron micrographs of fast and slow filter papers No. 41 and 42 respectively, in which the white dots represent the actual clear pore spaces distributed within the matrix of the papers. The surface distribution and dimensions of clear pore space can be estimated from these micrographs, besides assessing uniformity in the dispersion of the fibrous pulp from the density of blackening on the film. Obviously the surface density of pores, in fast filter papers is considerably higher (figure 1) as compared to that in slow filter paper (figure 2). Wire/cloth mesh size used during their manufacture can also be estimated (figure 2).



Figures 1–5. ($\times 5$). Contact electron micrograph of 1. filter paper no. 41; 2. filter paper no. 42; 3. bamboo made wrapping paper; 4. rice paper, and 5. draft pad paper.

Figures 3–5 show the morphological details from bamboo made wrapping paper, rice paper and draft pad paper respectively. The effective distribution of pulp and the extent of its pulverization can be determined from these micrographs.

Image formation in contact electron microscopy

depends in general, upon the differential scattering of electrons through the specimen material. Blurring of images due to inelastically scattered electrons can be reduced by minimizing the electron-specimen interaction time. Increased acceleration potential and minimal specimen thickness permits an en-

hancement of the component of the elastically scattered electrons and therefore high voltage electron microscopes appear more promising in this respect for the contact micrography of thicker and crystalline specimens.

It is believed that the newer materials tried with this new technique would further reveal its usefulness to a wider section of workers engaged in material characterization.

17 August 1987

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EFFECT OF POTASSIUM ON LEAF DIFFUSIVE RESISTANCE AND TRANSPIRATION

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POTASSIUM plays an important role in stomatal regulation¹ and maintenance of osmotic potential². A decrease in the transpiration in potassium-deficient plants^{3–7} and high transpiration in plants supplied well with potassium^{8,9} have been reported. Here we examine the effect of potassium on diffusive resistance and transpiration in cauliflower (*Brassica oleracea* L. var. Botrytis L. cv Pusa Deepali) grown in refined sand¹⁰.

Plants were grown with normal (4 mM) and low (0.2 mM) potassium. At 11 weeks, when low potassium plants had developed visible symptoms of potassium deficiency, the potassium supply was reduced to 0.2 mM in one set of normal potassium plants. In another set of low potassium plants, potassium supply was raised to 4.0 mM. The resulting effect was studied on the tissue concentration of potassium, leaf diffusive resistance

Table 1 Effect of potassium deficiency on tissue potassium, transpiration and diffusive resistance of cauliflower leaves

Treatment	Growth stage (weeks)			
	8	9	12	13
Potassium (% dry matter)				
Normal K	3.66			0.83
Low K	1.09			0.57
Normal K reduced to low K				0.50
Low K raised to normal K				2.83
Transpiration rate* (cm ⁻² s ⁻¹)				
Normal K	5.54 ± 0.78	6.61 ± 1.08	6.22 ± 1.67	8.04 ± 0.56
Low K	5.31 ± 0.39	6.33 ± 0.62	2.86 ± 1.03	4.12 ± 1.69
Normal K reduced to low K			6.52 ± 1.83	7.80 ± 1.55
Low K raised to normal K			6.99 ± 1.47	8.34 ± 0.31
Diffusive resistance* (scm ⁻¹)				
Normal K	2.29 ± 0.28	1.68 ± 0.18	1.72 ± 0.53	1.28 ± 0.08
Low K	2.39 ± 0.35	1.75 ± 0.14	4.24 ± 1.64	3.08 ± 1.69
Normal K reduced to low K			1.72 ± 0.56	1.39 ± 0.06
Low K raised to normal K			1.57 ± 0.44	1.27 ± 0.07

* Values for 8 and 9 weeks are the mean of 8 determinations ± S.E.M. and values for 12 and 13 weeks are the mean of 4 determinations ± S.E.M.