Plants containing the *R*1, *R*2, *R*3 or *R*4 genes singly, and in all combinations, which had been obtained from Dr. W. Black, of the Scottish Plant Breeding Station, were grown in the field and made satisfactory growth before blight appeared.

The first genotype to be attacked early in July was the one containing the *R*4 gene. Blight was next recorded by August 6, on the *R*1 *R*4 and *R*1 genotypes. By August 20 plants containing the following genes were recorded as having been attacked by the pathogen: *R*1, *R*2, *R*4, *R*1 *R*2, *R*1 *R*4, *R*2 *R*4, *R*1 *R*2 *R*4, and *R*1 *R*3 *R*4. Blight developed very slowly on the *R*1 *R*3 *R*4 genotype and plants remained green for almost three weeks after the first lesion was recorded. At this date no blight was noted on the *R*3, *R*1 *R*3, or *R*3 *R*4 genotypes, possibly as a result of differences in field resistance and/or plant development, as well as the apparently low virulence of this race (presumably race 1, 3, 4).

Blight was recorded from all genotypes, including the *R*1 *R*2 *R*3 *R*4 genotype, by September 19.

It thus appears that under suitable conditions the development of races of the pathogen may be quite rapid, and the value of the hypersensitive reaction, governed by the presence of the *R* genes, would therefore be of limited practical application.

Breeding studies now in progress[2] suggest that field resistance resulting from the presence of minor genes will be of greater value for commercial breeding. Toxopeus[3] has suggested that high resistance of foliage is not sufficient unless accompanied by a high resistance of tuber to the pathogen. This has been confirmed at Loughgall, where some seedlings showing considerable foliage resistance to the pathogen have produced badly infected tubers.

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Feulgen Reaction in the Fucales

The Feulgen reaction has not been used to any great extent in cytological investigations of the larger brown algæ[1–4], possibly on account of the difficulty of obtaining consistent results. The following technique has now been applied successfully to growing vegetative apices and to developing receptacles of all the British members of the Fucales, with the exception of *Pelvetia canaliculata*, on which it has not yet been tried.

The material to be examined is cut into small pieces and fixed for 12–18 hr. in Karpechenko fluid. Fixation with acetic alcohol was also tried but often gave inconsistent results even in neighbouring cells of the same preparation. This may be due to the alcohol in the fixative causing hardening of the cell walls and thus preventing even penetration.

After fixation the material is thoroughly washed in running water. It is important at this stage to remove all traces of the fixative since it contains formalin, which gives a red coloration with Schiff's reagent[5]. If traces of the fixative are left, a red colour develops in the cell walls and in the cytoplasm and obscures the nuclear reaction.

The material is then transferred to distilled water, brought up to a temperature of 60° C. and then hydrolysed in *N* hydrochloric acid at 60° C. The time of hydrolysis varies in different species, but usually a reaction was obtained over a fairly wide range of hydrolysis times, usually of the order of 15–30 min. This maintaining of the reaction over an extended period has been correlated[5] with the presence of chromic acid in the fixative.

Hydrolysis is stopped by placing the material in cold distilled water, after which it is transferred to freshly made Schiff's reagent for 3–12 hr. After bleaching in three changes of freshly made sulphur dioxide water, hand sections are cut of the portion to be examined, mounted in sulphur dioxide water and squashed by firm pressure on the cover-slip. If permanent preparations are required, the coverslip is allowed to drop off into sulphur dioxide water and the preparation dehydrated and mounted in 'Euparal'.

In all the species examined this technique has given a good, sharp reaction. The two main drawbacks are the pigmentation of the plastids of the meristoderm and the outer cortex due to the fixative, and the fact that the technique may not macerate the material sufficiently for thorough squashing. Both these difficulties may be overcome by bleaching with hydrogen peroxide after fixation and before hydrolysis. The time of bleaching must be adjusted according to the nature of the material, delicate structures such as the receptacles of *Cystoseira granulata* requiring shorter periods than the apices of *Halidrys siliquosa*. Usually a period of 3–4 hr. in 20 per cent hydrogen peroxide has proved successful.

If bleaching has been used, then the time of hydrolysis must be considerably reduced, usually 7½–10 min. proving adequate.

This technique has been used successfully on both resting and dividing nuclei. In the former it has demonstrated a finely granular chromatin reticulum in species of *Fucus* and chromocentres in *Bifurcaria rotunda*, *Halidrys siliquosa* and *Cystoseira tamariscifolia*. All stages of division have given a sharp reaction in nuclei of both vegetative and reproductive cells.

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Leaf-Enations in *Dahlia variabilis* Desf. induced by Tomato Spotted Wilt Virus

During a survey of virus-infected dahlias (*Dahlia variabilis* Desf.) in private and commercial gardens in south-west England, one diseased plant of the variety Jean was found bearing enations (Fig. 1) similar to those induced in some other solanaceous species by tobacco mosaic[1], tomato aspermy[2] and other viruses. The diseased plant was stunted and the foliage symptoms included irregular mottling and both ringspot and so-called 'oak-leaf' or chevron patterns. Oak-leaf and ringspot symptoms were occasionally present on the same leaf.

Ringspot symptoms in virus-infected dahlias have been attributed to tomato spotted wilt virus[3], dahlia ringspot virus[4] and dahlia yellow ringspot virus[4]. Oak-leaf symptoms have been attributed to dahlia oak-leaf virus[4], tomato spotted wilt virus[5] and, more recently,