The clone 29 (*C. pendulus*) is a tetraploid ($2n = 40$). Its growth habit is distinctly different from any of the *C. flexuosus* variety. Efficient establishment, faster growth and better regeneration, profuse tillering and high leaf/stem ratio are some of the unique morphological features of this clone. It is also more vigorous than other strains of *C. pendulus*, with similar taxonomic behaviour.

The economic viability of the clone 29 lies in its higher productivity of oil which is the function of its high biomass and high oil content (due to high leaf/stem ratio). A greater number of harvests per year (4–5 as compared to only 3–4 in others) accentuated by faster regeneration capacity further enhances its oil productivity, hence citral yield. Its establishment even under moisture-stress condition is remarkable. Thus, the clone 29 (*C. pendulus*) being much superior over even the best clone/variety of *C. flexuosus*, offers an additional and potential source of citral for diverse commercial uses.

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POLLEN MITOSIS AND EXTRACLINAL VARIATION IN *OPHIOPOGON INTERMEDIUS* D. DON

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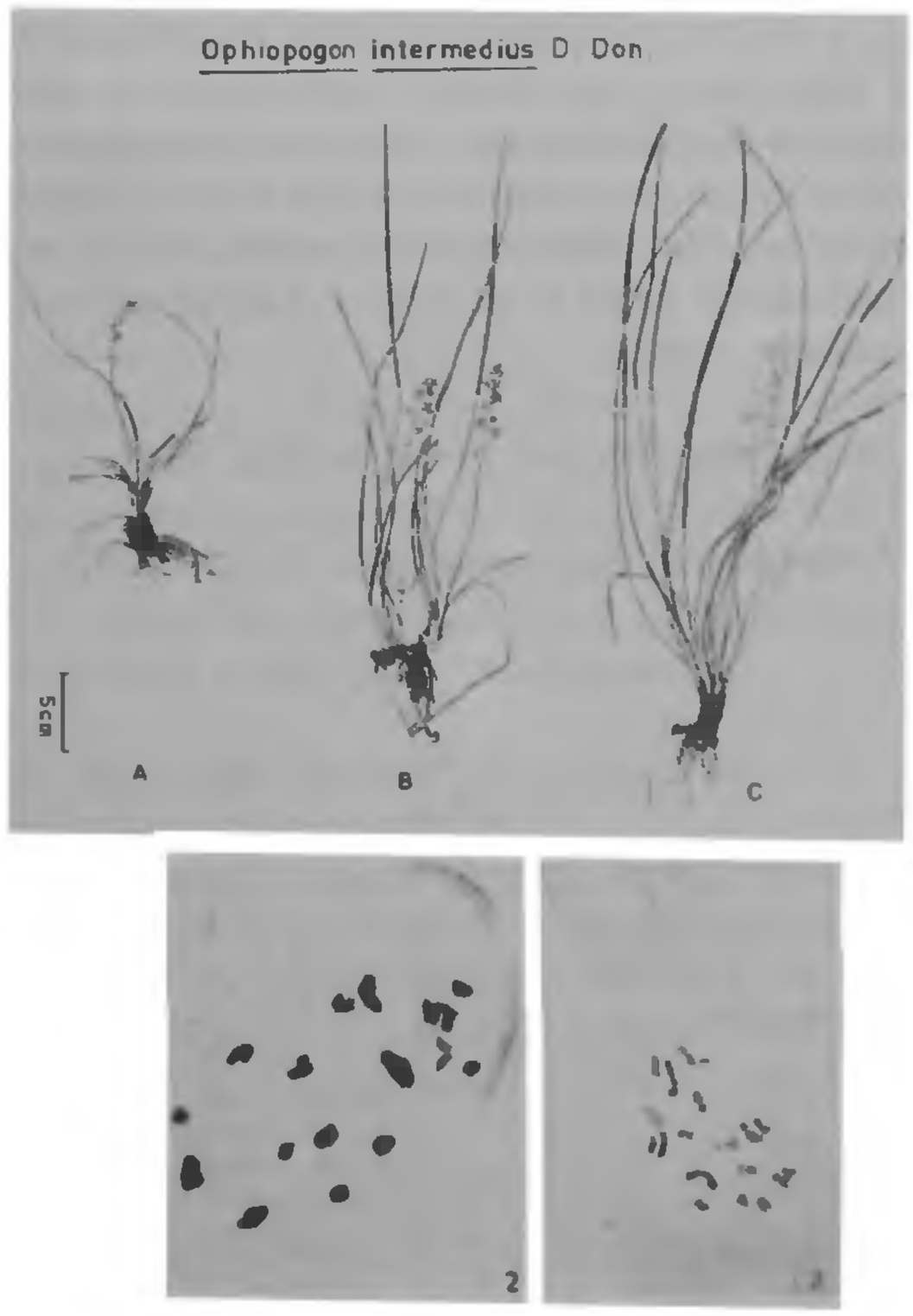
It was Khoshoo[1] who reported for the first time that in dicotyledonous genus *Impatiens*, chromosome number could be ascertained from pollen mitosis even when the anthers were taken from herbarium specimens. The present study furnishes a parallel example in a monocotyledonous taxon, *Ophiopogon intermedius*. This taxon was sampled from three different localities of Simla along a geographical gradient ranging between 1,250 and 2,400 m. The localities were Jakhoo (2,400 m), Cart Road (1,950 m) and Dhobi-Ghat (1,250 m). Both PMCs and pollen mitoses revealed $n = 18$ (figures 2, 3). For pollen mitoses, anthers from mature flowers (kept in 70% ethanol for 24 hr) were squashed in acetocarmine. In about 4% of the pollen grains, well spread mitotic chromosomes could be observed. After putting the coverslip, the slide was heated to burst such pollen grains to release cytoplasm and chromosomes. The karyotype could easily be ascertained from such a preparation (figure 3). A number of individuals from the three populations were scanned for any karyotypic differences but in all of them, essentially similar karyotype was observed which consisted of four median, eight submedian



Figures 1–3. 1. Plants of *Ophiopogon intermedius* collected from Cart Road (1,950 m; A), Jakhoo (2,400 m; B) and Dhobi-Ghat (1,250 m; C). **2.** $n = 18$ at prometaphase. **3.** Pollen mitosis showing $n = 18$.

and six subterminal chromosomes. The present taxon was a diploid, though a number of cytological races from W. Himalayan region have earlier been reported by Mehra and Malik[2].

In a widespread species, morphological variation along a geographical gradient is usually continuous or intraclinal. But in the present taxon, the variation in some of the more apparent morphological characters was not continuous. The magnitude of measurements in respect of plant height, leaf length, scape length and length of the raceme was much less in Cart Road taxon collected from 1,950 m as compared to Jakhoo and Dhobi-Ghat taxa collected from 2,400 m and 1,250 m respectively (figures 1, 4, 5). Extraclinal variation was thus quite evident.

In nature the plants of this species are not found on sunny slopes. The prevalent gaps along the geographical gradient were created by environmental jumps caused, over the years, by indiscriminate felling of trees and these were responsible for the separation of the three units of once continuously growing species. The local populations then diversified in their restricted niches. This is supported by the observation that shorter statured plants were noticed in the middle part of the distributional range without any inter-gradation towards lower or higher elevations. The differentiation seems to be restricted to the genic level only as karyotypes were essentially similar.

12 May 1986; Revised 17 September 1986

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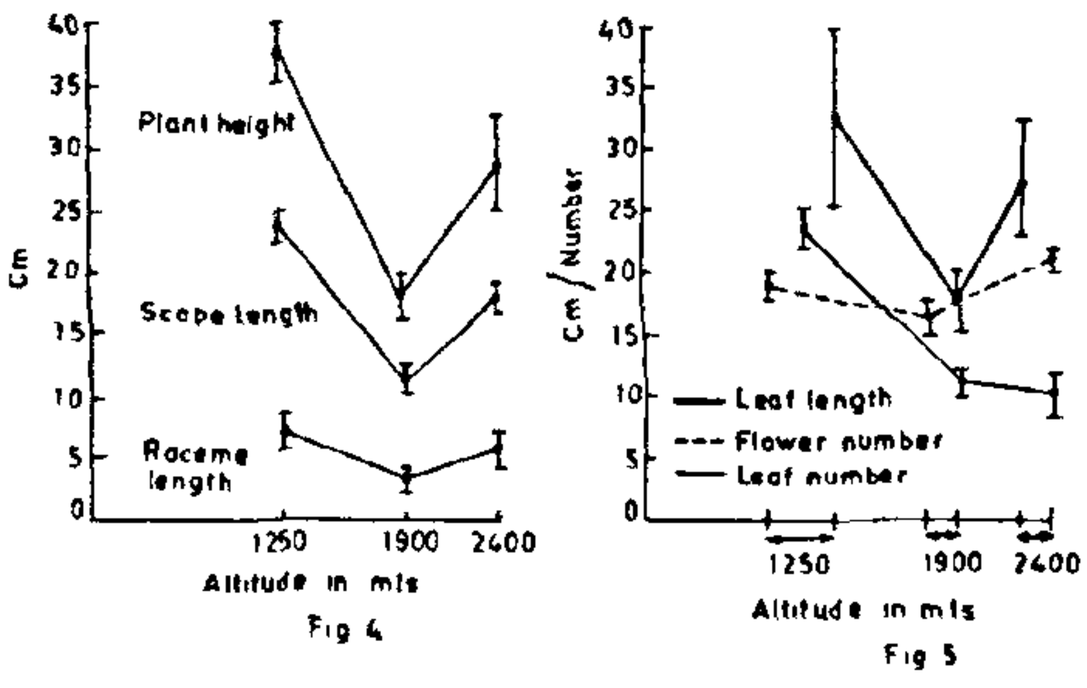

Figures 4 and 5. Graphs showing variations in some of the morphological characters recorded in individuals of the three populations collected from three different altitudes.

TECHNIQUE TO DETECT GRAIN SPOT OF RICE CAUSED BY *TRICHOCONIELLA PADWICKII* (GANGULY) JAIN

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TRICHOCONIELLA PADWICKII (Ganguly) Jain is an important seed-borne pathogen of rice[1,2]. It causes stack burn, leaf spot[3], seedling blight[1], grain discoloration[4] and grain shrivelling[5]. Ou[5] reported that grains infected by the fungus show pale brown to whitish spots with a dark brown border of relatively large size on the glumes. However, there is no report of the occurrence of spot caused by this fungus on grain (husked rice).

Recently typical symptoms of *T. padwickii* infection on the grain were observed. These spots could not be identified by dry seed examination as husks were devoid of such symptoms. Hence alkali soaking technique was used to detect the grain spots in bulk seed lots. Fifty-eight seed samples received from Andaman and Nicobar islands and 22 samples collected from Dakshina Kannada District, Karnataka were analyzed for the presence of grain spot. Two hundred seeds from each of 80 samples were soaked in 50 ml of 0.4% NaOH in 100 ml Ehrlenmeyer flasks under laboratory conditions. The solution was decanted after 12 hr. The seeds were immersed in water in a petri plate and visually examined for the occurrence of grain spot.

To confirm the association of *T. padwickii* with grain spots, apparently healthy seeds were randomly picked from infected seed lots. The husks were removed using forceps and needle and grains with spots were separated. Twenty-five such grains from each infected sample were surface-sterilized with 1% NaOCl for 5 min and placed on wet blotters in petri plates. The plates were incubated under 12/12 hr alternate cycles of near ultraviolet light and darkness at 22 ± 2°C.

To assess the actual incidence of *T. padwickii*, 13 out of 80 seed samples were analyzed by standard blotter method[6] and the results were compared with grain spot incidence.