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POTENTIAL BIOLOGICAL CONTROL OF *PARTHENIUM HYSTEROPHORUS* L.

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RECENTLY a weedy species of *Cassia* L. has been reported from many parts of Maharashtra and Karnataka. It was first reported[1] as a new species from Pune, which neither had a specific name nor any Latin diagnosis and therefore, was invalid. However, it was first collected by Singh[2] in August 1976 from Bijapur district of Karnataka State, who reported it as a new record for India based on the confirmation of Dr H. C. D'de' Wit. Raghavan[3] once again reported it based on the above said Gurav's collection, confirmed by Dr. R. M. Polhill.

A native of Tropical America, *Cassia uniflora* Mill. (*C. sericea* Sw.) has weedy tendencies even in its native habitat and as also indicated by Singh[2] for India. On further continued observations at Pune, it has been noticed that it started occupying larger areas, especially along the roadsides, and has been penetrating the areas traditionally occupied earlier by *Parthenium hysterophorus*. Therefore, the replacement of *P. hysterophorus* by *C. uniflora* is a welcome stage, which sometimes is total but limited to a narrow strip along the roads. As it is a leguminous plant, it may enrich the soil by nitrogen fixation. It sets seed profusely which can easily be collected and used.

P. hysterophorus attracts the attention of a majority of workers especially those of weed controllers, but so far no satisfactory results have emerged. Therefore, *C. uniflora* may be used to biologically control *P. hysterophorus*.

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REGENERATION FROM GLUME CALLI OF HEXAPLOID TRITICALE

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TRITICALE, an amphidiploid of wheat and rye, is the first man-made cereal which is superior in total protein and lysine content, besides other useful characters, like hardiness and disease resistance over wheat.

Plant breeders have been utilising the conventional and mutation breeding methods for the improvement of the triticale over the past several years but with little success. Plant tissue culture techniques complement the breeding methods in genetic engineering of crop plants. The successful utilisation of different explants at various developmental stages, for callus initiation and rapid plant regeneration is a prerequisite for such an approach. Tissue culture studies with triticale are mostly confined to immature embryos[1] and anthers[2]. Our earlier studies have suggested that among different seedling explants, shoot base was more efficient for callus initiation and plantlet regeneration[3]. The present investigation mainly deals with the use of glumes, at three developmental stages for successful callus initiation and plantlet regeneration.

Boots of hexaploid triticale strain DTS 330 were collected from the main tillers of field grown plants at different ages of five, ten and fifteen days after panicle initiation. The boots were sterilised with 0.1% mercuric chloride for about fifteen minutes followed by thorough washing with sterile distilled water under sterile transferhood. Glumes from sterilised boots were taken and transferred onto Linsmaier and Skoog's media[4] (LS) with 2 mg/l, 2,4-dichlorophenoxy acetic acid (2,4-D) for callus initiation. After five weeks, glumes giving rise to callus were recorded. The calli were later subjected to regeneration. Four types of media were used for regeneration; LS basal media; LS media with 0.5 mg/l Kinetin (KN) plus 0.1 mg/l napthalene acetic acid (NAA); and LS media

Figure 1A–B. Callus initiation and plantlet regeneration from glumes of triticale. **A.** Five-week old callus. **B.** Plantlet regeneration from seven-week old calli.

with 1 mg/l KN plus 2 mg/l NAA and LS media with 2 mg/l KN plus 1 mg/l NAA. Calli were grown under flourescent light at 26 ± 2°C for regeneration.

Callus was successfully initiated from the glumes on LS media with 2 mg/l 2,4-D (figure 1 A). Callusing ability of different age groups varied significantly. Among three age groups tested over hundred samples, ten-day old glumes were more efficient for callus initiation (30-35%) compared to five (20-25%), followed by fifteen days (10-12%).

Successful regeneration of plantlets (figure 1 B) was observed on media supplemented with 0.5 mg/l KN plus 0.1 mg/l NAA (7%). On the other hand only roots were regenerated on media with 1 mg/l KN plus 2 mg/l NAA besides basal media. Shoot bud initiation and extensive rooting was observed on the media supplemented with 2 mg/l KN plus 1 mg/l NAA. Subsequent transfer of these shoot buds onto basal media resulted in development of complete plantlets after two weeks. The suppression of further development of shoot buds into complete plantlets on media with 2 mg/l KN plus 1 mg/l NAA may be due to the inhibitory effect of excess levels of either auxin and/or cytokinin as evidenced by plantlet regeneration when these were transferred onto media devoid of hormones.

The present study shows that ten-day old glumes were more efficient for callus initiation compared to five and fifteen days, suggesting the importance of developmental stage and the physiological state of the explant used. That the media supplemented with 0.5 mg/l KN plus 0.1 mg/l NAA was superior for plant regeneration clearly suggests that specific concentration and ratio of kinetin and NAA plays an important role.

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DIFFERENTIATION OF MULTIPLE SHOOT BUDS AND PLANTLETS IN CULTURED EMBRYOS OF *CAPSICUM ANNUUM* L. VAR. *MATHANIA*

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FOLLOWING the success in rapid multiplication of orchids by shoot meristem culture[1], considerable progress has been made in the clonal multiplication of several plant species such as *Asparagus*, *Chrysanthemum*, *Gerbera* and others[2]. The main intent of clonal propagation is to quickly establish uniform plants with predictable qualities. Various explant sources have been used for clonal propagation. Embryos have been successfully used for clonal propagation in *Cichorium endivia*[3], *Solanum melongena*[4], *Hordeum vulgare*[5]. *Capsicum annuum* is an economically important crop and not much work has been done to establish culture conditions for its regeneration. George and Narayanaswamy[6] reported haploid plants through anther culture in *C. annuum* var. *grossum*, and later Gunay and Rao[7] observed regeneration from hypocotyl and cotyledon explants. In the present communication we report formation of multiple shoots (20–25 per embryo) and their further development into complete plantlets from excised mature embryos.

Seeds of *C. annuum* var. *mathania* procured from the Agriculture Research Station, Durgapura, were soaked in tap water for 24 hr, then surface-sterilized with 0.1% mercuric chloride for about 5 min, and were thoroughly washed with sterilized water. Embryos were excised aseptically and cultured on Murashige and Skoog[8] (MS) medium supplemented with kinetin (K) and 6-benzylaminopurine (BAP) alone or in combination with indole acetic acid (IAA) and 2,4-dichloro-phenoxyacetic acid (2,4-D) (figure 1). The pH of the medium was adjusted to 5.8. The cultures were maintained in diffused continuous light from fluorescent tubes and incandescent bulbs at 26 ± 2°C.