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EFFECT OF STIK ON SPROUTING IN THE STEM CUTTINGS OF *PYRUS PASHIA* BUCH.-HAM. EX D. DON

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THE physiomorphological effect of application of various growth regulators on rooting in stem cuttings has been studied by several workers[1-7]. The growth regulators extensively used by these workers were auxins, especially indoleacetic acid (IAA) and naphthaleneacetic acid (NAA). Though all the auxins have similar qualitative effects, they elicit different responses by the plant owing to differences in their chemical properties[2]. A new growth regulator, Stik (whose active ingredient is NAA as the sodium salt), has also been used and its stimulatory effect on rooting and regeneration of stem cuttings of *Aerva sanguinolenta* has already been proved[8]. This growth regulator has also been shown to stimulate the activity of lenticel meristem in *Sapium insigne*[9].

Stem cuttings of approximately equal diameter (8–10 mm) and length (20 cm) were taken from a healthy *Pyrus pashia* tree growing at an altitude of 1500 m above MSL. Five concentrations, viz. 0.1, 0.2, 0.5, 1.0 and 2.0 mg/ml, of Stik were prepared in distilled water. The cuttings were grouped into batches of 25 for each of the five concentrations and their basal ends were dipped in Stik to a depth of 5 cm for 48 h at room temperature (13 ± 1°C). Control cuttings were dipped in distilled water. All the cuttings were then placed up-side-up in pots containing garden soil and kept under laboratory conditions (9–17°C). The upper ends of the twigs were covered with moist cotton to avoid drying. The experiment was started in the middle of December and the final observations were recorded after five weeks.

Stik has proved to be very potent in inducing sprouting in stem cuttings of *P. pashia*. Although the control set also exhibited sprouting, it was very much less than the sprouting in 0.1 and 0.2 mg/ml of Stik. Further, the adventitious buds produced on cuttings of the control set did not increase much in length. A visible sign of initiation of sprouting was observed first on cuttings treated with 0.1 mg/ml Stik on day 12 of treatment. Cuttings treated with 0.2 and 1 mg/ml Stik showed sprouting on day 15 and those treated with 0.5 and 2 mg/ml on days 17 and 19 respectively. In the control set, sprouting could be observed only on day 22. For all the parameters studied, 0.1 mg/ml was the most potent concentration, followed by 0.2 mg/ml. The leaves were of normal shape and size on cuttings treated with 0.1 and 0.2 mg/ml Stik and on control cuttings (figure 1A–C), but were variously deformed in the other cases (figure 1D–F). In the case of 1 and 2 mg/ml Stik, the leaves became narrower, longer and leathery (figure 1E, F).

The above observations indicate that Stik has a marked influence on adventitious sprouting in *P. pashia*. That the effect is greatest for 0.1 mg/ml Stik is in agreement with the findings of Singh and Paliwal[8], who showed that 100 and 500 ppm (i.e. 0.1 and 0.5 mg/ml) Stik hastened sprouting and subsequent shoot growth in stem cuttings of *Aerva sanguinolenta*. Sharma *et al.*[9] have reported a similar effect of Stik on the lenticel meristem in *Sapium insigne*. Eliason and Areblad[7] reported that IAA at 100 μM usually increased the number of roots, although variable results were obtained with IAA concentrations in light-grown stem cuttings of *Pisum sativum* cv. Weibull's Marina.

As far as the physiomorphological effect is concerned, it has been concluded that the stimulation of sprouting caused by Stik treatment is probably a consequence of conversion of starch to soluble sugars, which thus became available for active cell division and subsequent elongation, as has been postulated by Nanda *et al.*[10] The rapid degradation of starch by auxins is brought about by an increase in the activity of hydrolytic enzymes[11-13]. Altmann and Wareing[14] have also shown that IAA has a definite impact on sugar accumulation; however, according to them the relationship between auxins and carbohydrates is complex, since the auxins may influence basal carbohydrate accumulation directly as well as via the sink arising from the auxin-

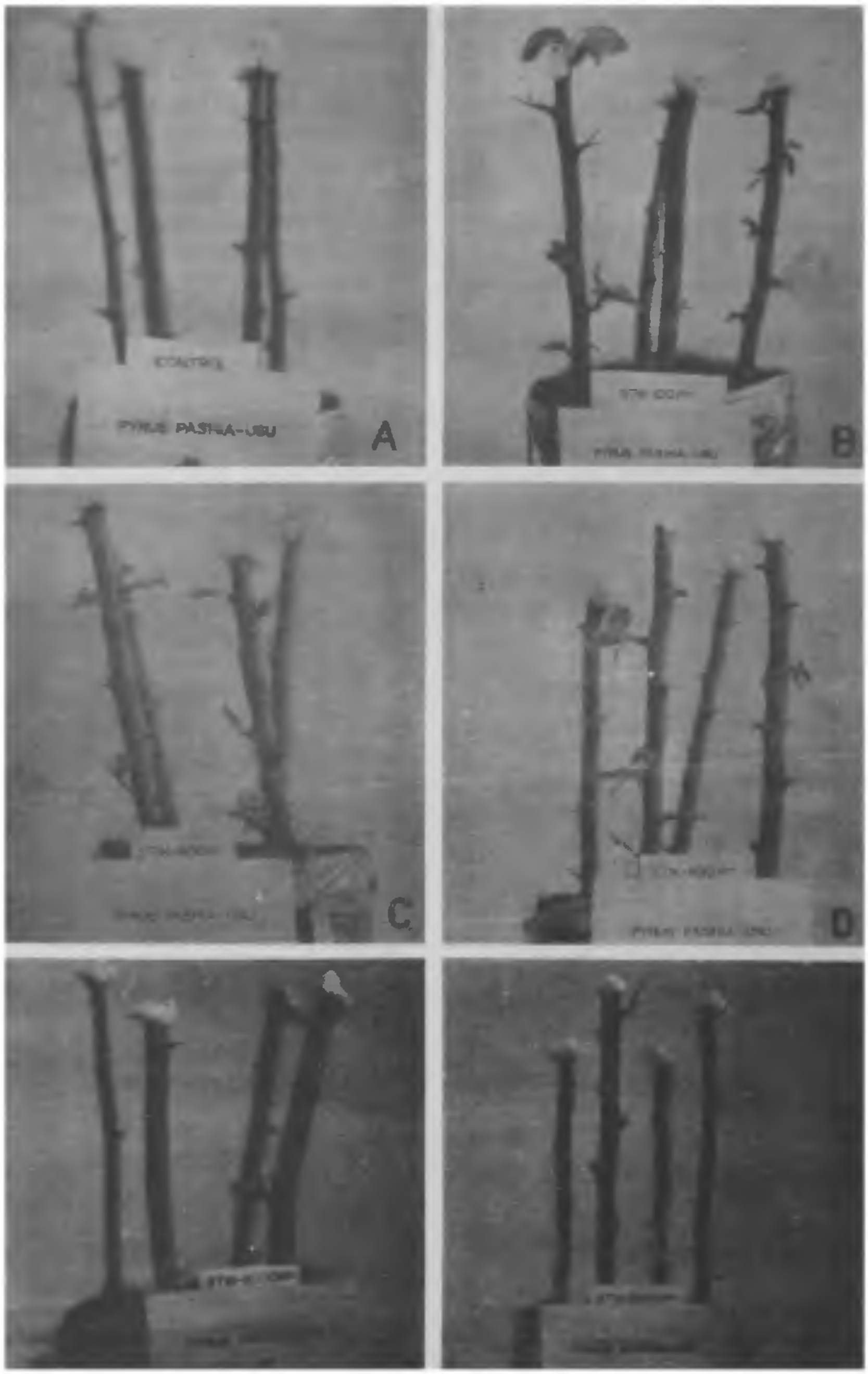

Figure 1. Effect of concentration of Stik on sprouting in stem cuttings of *Pyrus pashia*.

induced rooting. The sprouting induced by the application of Stik in *P. pashia* therefore appears to be mediated by its effect on mobilization of reserve food materials caused by enhanced activity of hydrolytic enzymes. Whatever sprouting was observed in the control set was most probably due to a small amount of endogenous auxin present at the time of cutting.

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NEW EVIDENCE ON THE PHYLOGENY OF BASIC CHROMOSOME NUMBER IN *PENNISETUM*

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THE genus *Pennisetum* (L.) Rich., which belongs to the family Poaceae, has species with chromosome numbers in multiples of $x = 5, 7, 8$ and 9. Of the several economically important species in this genus, pearl millet (*Pennisetum glaucum* (L.) R.Br.) is an important food and fodder crop. Based on chromosome pairing in haploids and interspecific hybrids, Jauhar[1,2] concluded that the chromosome complement of pearl millet ($2n = 14$) was derived from a basic set of $x = 5$ chromosomes. This was contradicted by Manga and Pantulu[3]. The present work on the cytogenetics of wild relatives of pearl millet gives new cytological evidence on the phyletic basic chromosome number and its evolution.

The wild species included in the present study are *P. ramosum* (Hochst.) Schweinf., *P. schweinfurthii* Pilger, and *P. mezianum* Leeke, which were obtained from the wild *Pennisetum* garden maintained by the Genetic Resources Unit, ICRISAT. For cytological studies, young inflorescences were fixed in acetic alcohol (1:3). Iron acetocarmine squash preparations were made from the pollen mother cells (PMC). Photomicrographs of chromosome pairing were taken from the temporary squashes.

Meiosis in *P. ramosum* is normal, with the ($2n = 10$) chromosomes invariably formed into five ring bivalents, one of which is associated with the nucleolus (figure 1A).

Meiosis in *P. schweinfurthii* showed its chromosome number to be $2n = 14$, and the chromosomes paired mostly as seven bivalents. However, of the 60 PMC analysed, 30% showed two trivalents and four bivalents (figure 1B), 45% showed six bivalents and two univalents, 10% had one quadrivalent, four bivalents and two univalents, and the remaining 15% showed seven bivalents. The bivalents are mostly ring bivalents. During anaphase I, most of the cells showed 7:7 normal chromosome distribution. However, a few cells (8%) had 8 6 distribution. The subsequent stages of meiosis were normal. Pollen fertility, as judged by stainability with acetocarmine, was 73%.