compared to females, whereas normal insects followed the opposite pattern. The results are in agreement with Maya Menon[6]. According to her, there was a difference in protein constitution in the blood of the two sexes; it was greater in female cockroaches when a growth is taking place.

NIA 23509 had also exhibited an atrophy of the reproductive system in the treated insects. Sixth instar males when dissected out had deformed testes and the most affected part was vas deference. They were thin and elongated compared to normal. Accessory glands were reduced in size considerably (figures 1 and 3).

The female reproductive system was equally affected with poorly developed ovaries. The germarium and ovarioles looked as if the content inside were all disintegrated. The oviduct was very thin and elongated compared to a normal one (figures 2 and 4). This type of suppressed gonadal growth in *Blatella germanica* was reported by Pincus[7] which could be attributed to the action of JHA.

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REGENERATION OF A TREE— *LEUCOSCEPTRUM CANUM* SM. THROUGH MERISTEM CULTURE.

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THE application of tissue culture for rapid propagation of trees offers forest biologists unique method for increasing forest productivity. In contrast, conventional vegetative propagation through cuttings in tree species generally fails because of the difficulties in rooting. Moreover, from tissue culture experiments one can probably get an insight of the factors, especially of auxin requirement, for root initiation and such knowledge can also be employed to stock or scion, for the development of roots, when propagation through grafting is aimed.

So far, a number of reviews have appeared where success has been achieved to regenerate whole plants from angiosperm trees[1-4]. However, the number of such reports is meagre in comparison to the existing tree angiosperms. Most of the achievements are from the embryonic or seedling tissue rather than mature trees. Methods for clonal propagation from mature trees would be more useful in forestry. Furthermore, multiplication of plant through meristem culture is the most common method for conservation of existing genotype[5]. During the present study an attempt has been made to propagate *Leucosceptrum canum*, a Labiatae tree through apical and axillary meristems of mature trees.

Buds from a 40 ft *Leucosceptrum* plant in Gantok, Sikkim, were collected by courtsey of late Dr V. N. Gadgil. Apical portion (1–1.5 cm) and small (ca. 1.5 cm) stem segments at nodes with axillary meristems of young twigs were washed thoroughly with water and then treated for 10 min with 5% Teepol solution. After washing the Teepol completely, plant materials were sterilized with 0.1% (w/v) mercuric chloride solution for 3 min followed by five washings in sterile distilled water. The apical meristems (ca. 0.5 mm) and axillary meristems were dissected aseptically and placed (one per culture tube) on different media with the cut end in contact with the medium. MS basal medium[6] supplemented with different concentrations (*i.e.* 0.1, 0.5, 1.0, 2.5 and 5.0 mg/l) of 6-banzylaminopurine (BAP) or kinetin alone and in combination with indole-3-acetic acid and indolebutyric acid (IBA) at 0.1 and 0.5 mg/l was tested. The cultures were incubated at 25 ± 2° C, ca. 55% humidity, under a photoperiod of 16 hr light (2000 lux).

Of the different supplements tried so far, rapid response was obtained in BAP–2.5 mg/l and BAP–0.5 + IBA–0.1 mg/l where leafy shoot-buds developed within 7 days of incubation. In the latter medium a prominent apical dome with two leaves appeared from the apical shoot meristem; which after excision of the two leaves sub-cultured on the same medium produces multiple shoot-buds (*i.e.* 3–5 per explant). Thus, from a single meristem, over 50 shoot-buds could be obtained within a month by 3 subcultures of 7 days each, keeping a few shoot-buds intact. Shoot-bud formation was delayed by 3 or 4 days when axillary meristems were taken as explants. No roots were formed when shoots with 6–10 leaves (figure 1) were transplanted to MS basal medium without any growth regulators. However, when transferred on to MS consisting of half strength macrosalts and supplemented

Figures 1–5 *Leucosceptrum canum*. **1.** Shoots with 10 leaves regenerated from apical meristem. **2.** Root formation at the node of meristem regenerated plant. **3.** Plantlet with root and shoot from nodal explant of meristem regenerated plant. **4.** Compact brown callus and 3 new shoots at the base of the main shoot in BAP containing medium. **5.** Isolated compact callus.

with α-naphthyleneacetic acid or IBA at 1,2 and 3 mg/l each, roots were differentiated. Profuse rooting initiated within 10 days in photoperiodic condition, the maximum root initiation taking place in the medium with IBA-2 mg/l. Root initiation also occurred from the base of the shoots when they were maintained for over 4 passages (each of 28 days) in the medium supplemented with BAP–0.5 mg/l plus IBA 0.1 mg/l. In this medium when shoots were maintained for long *i.e.* even after 7th passage multiple shoots (*i.e.* 6 to 9) regenerated from the basal portion of the main shoot. Exploiting such a situation one may get thousands of plants within one year.

It was observed that roots (1–3 in number) were also developed from the nodes of *Leucosceptrum* plants (figure 2) and the rooting proceeds in acropetal order in the shoot axis. Interestingly, presence of such adventitious roots is not noticed in *in vivo* plants. Such nodes with roots when grown as explants on the media containing BAP–0.5 or 1 or 2.5 mg/l alone and in combination with IBA–0.1 mg/l, produced 2–6 new shoot-buds. When these shoot-buds were processed in the way described above, these developed into full-fledged plantlets with roots (figure 3). This technique is also useful for mass propagation of this Labiatae tree.

In all the media containing BAP, a compact brown callus (figures 4,5) was produced from the base of the shoot after 2nd passage. It was interesting that roots when produced in later subcultures from the regenerated plants, they developed only from the base of the shoots and never from the calli. Such calli when isolated and subcultured in all these media neither differentiated shoots nor roots. Though the callus grew on MS basal medium without any hormone when attached to the plant, the isolated callus failed to proliferate when subcultured on MS basal medium without any growth hormones. The growth of isolated callus was stimulated on the MS basal medium containing BAP–2.5 or 5.0 mg/l or BAP–0.5 + IBA–0.1 mg/l, more so in light than in the dark.

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OCCURRENCE OF ALGAE IN THE AERIAL BIOMASS AT BAREILLY (INDIA) AND ITS BEARING ON HUMAN ALLERGY

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THE pollen grains and fungal spores are the best