4) характеризувались кращим ростом основної породи у висоту і в товщину порівняно з такими ж насадженнями, але без участі ліщини (п.п. 5). Різниця по запасу деревини між цими варіантами становила 22 м^3.

Середній річний приріст 20-річних насаджень сосни з підліском ліщини становив 8,8 м^3, а запас деревини у цьому віці досяг 176 м^3.

Висновки

1. Для раціонального використання дерново-підзолистих ґрунтів під лісовими культурами слід створювати складні насадження, одним із компонентів якого повинна бути ліщина.

2. Введення ліщини в лісові насадження сприяє збільшенню запасу лісової підстилки, багатої поживними речовинами. Домішка листяного опаду ліщини в лісовій підстилці забезпечує помірну її мінералізацію і поступове покращення фізико-хімічних властивостей ґрунту і його родючості.

3. Під культурами сосни з підліском ліщини забезпечується позитивний баланс поживних речовин у ґрунтів, за рахунок чого ріст таких лісостанів поліпшується.

Література

1. Гордиенко М.И. Культуры сосны обыкновенной. - К.: Изд-во УСХА, 1997. - 58 с.

2. Гордієнко М.І., Гордієнко Н.М., Леонтяк Г.П., Карпенко В.І. Ліщина звичайна //Лісовий журнал. - 1993. - № 4. – С. 19-20.

3. Гринченко В.В. Улучшение состояния и повышение продуктивности сосновых насаждений свежей субори Полесья Украины сохранением и вводом лиственных город. Автореф. дис. ... канд. с.-х. наук. - К., 1972. – 32 с.

4. Зонн С.В. Влияние леса на почву. - М.: Изд-во АН СССР, 1954. -160 с.

5. Лавриненко Д.Д. Наукові основи підвищення продуктивності лісів Полісся УРСР. - К.: Вид-во УАСГН, 1960. – 194 с.

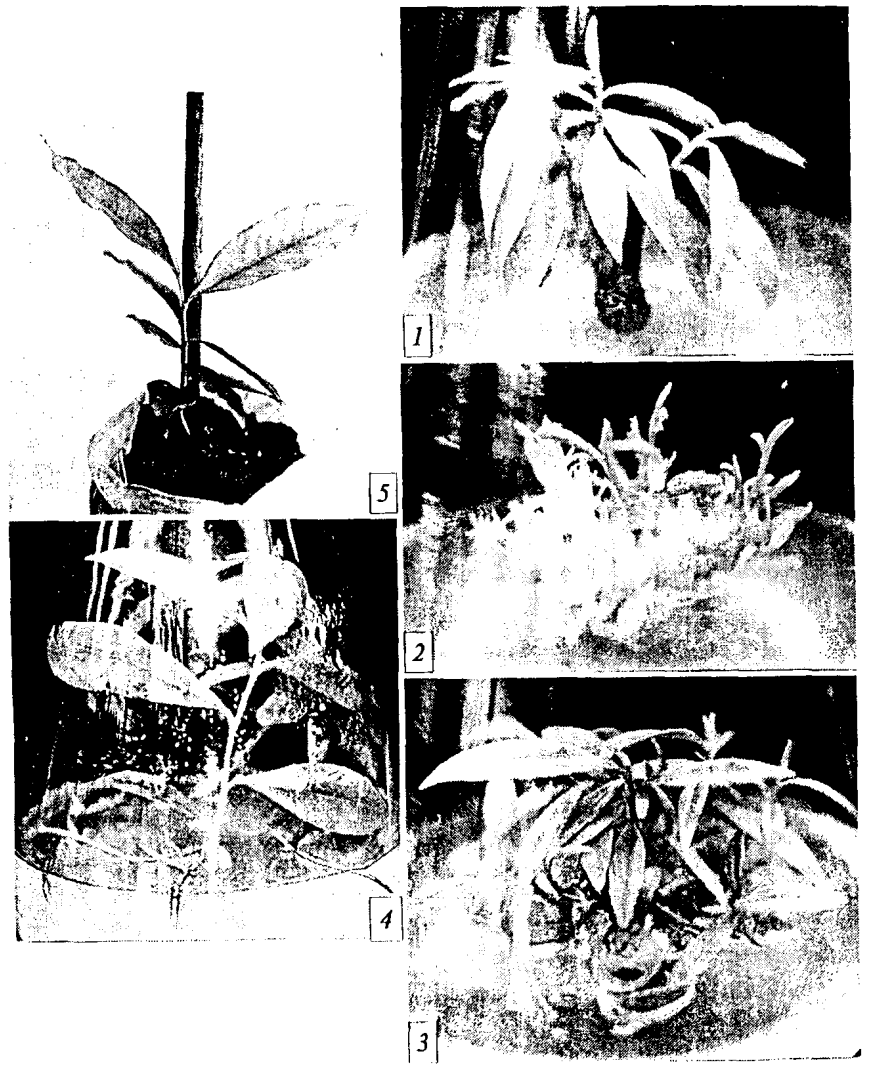
6. Смолянинов И.И., Пастернак П.С., Рябуха Е. В., Угаров В.Н. К проблеме оценки почвенного питания древесных пород и лесных насаждений //Питание древесных растений и проблема повышения продуктивности лесов. - Петрозаводск, 1972. – С. 47-73.

Tran Van Minh - Bui T. Tuong Thu - Nguyen Van Uyen, Institute of Tropical Biology, 1 Mac Dinh Chi Str., HoChiMinh City, Vietnam

MANIPULATION OF PLANT TISSUE CULTURE TECHNIQUES IN WOODY SPECIES PRESERVATION AND IMPROVEMENT IN VIETNAM (1) MERISTEM CULTURE IN SANDAL WOOD (*AQUILARIA CRASSNA* PIERRE EX. LECOMB)

Sandal wood (*Aquilaria crassna* Pierre ex. Lecomb) is one of the special and valuable wood species of the tropical rain forest. It grow naturally in Vietnam forest, classified in rared and valuable group of forest trees (Chan, 1996), conservated as a gene resource (Nghia et al., 1996) and prohibited from exploitation (Chanh et al., 1998). Latex condensation at wounded sites on the plant form inner special material called sandal flavour having high export value. However, on characteristics of this plant species was limited. So it was over exploited that the species are near to be extinct. Application of plant biotechnology in micropropagation for conservation and propagation of this plant which is the only source of condensated sandal were necessary.

Materials: Explants were young branches containing shoots of sandal plant having latex condensatee in the forest of Phu Quoc Island (South of Vietnam). They were cooled by ice in PP box and transferred to the laboratory by airplane in the same day.



Picture 1: Culture of internode explant after 3 weeks

Picture 2: Culture of meristem tissue after 4 weeks

Picture 3: Culture for multishoot proliferation after 5 weeks

Picture 4: In vitro plants rooting after 4 weeks with plant height 30-40 mm

Picture 5: Potting plant after 4 weeks with plant height 12cm

Methods: The branches were washed with soap-water and water, and cut into explants with young shoot tips and young internodes separately. The explants were sterilized by 0.1 % HgCl2 for 20 minutes, followed by rinsing three times in sterile distilled water. The explants were cultured on the WPM and MS media. WPM (Lloyd & McCown, 1980) and MS (Murashige-Skoog, 1962) were used as based media and supplemented with plant growth regulators as BA and NAA, and coconut water (CW). All media were supplemented with 20g/l sucrose and 8g/l agar prior to autoclave sterilization for 25 minutes at 121°C. The cultures were incubated at 28°C, under an 8 hour photoperiod with a light intensity of 34.2mmol/m^2/s. Each treatment consisted of 10-15 explants and was repeated four times.

Preservation and micropropagation via meristem culture: WPM medium was the most suitable medium for shoot initiation, shoot proliferation, shoot elongation and rooting cultures. In shoot intiation cultures, multiple shoots were observed on internode explants or meristem tissues cultured on WPM medium supplemented with 0.1mg/l BA and 10 % CW or 0.1mg/l BA, 0.1mg/l NAA and 10 % CW after 2-4 weeks of culture. There are 12-15 small shoots initiated on the meristem explant and the explants cultured of internodes develop only 1-4 shoots (picture 1,2). In shoot proliferation cultures (picture 3), the explant with multiple shoots was cut into 3-4 smaller explants before culturing them on WPM medium supplemented with 0.1mg/l BA, 0.5mg/l NAA and 10% CW formed the highest mean number of shoots per explant of 18-22 after 4 weeks of culture. In shoot elongation cultures, each multiple shoots explant was cut into 4 clumps having 4-5 shoots per clump before culturing them on WPM medium supplemented with 0.1mg/l BA and 10% CW elongated plant height of 50-70mm after 4 weeks of culture and had leaves developed and shoots were raised into buds. In rooting cultures (picture 4), the buds were cultured on MS and WPM medium supplemented 0.3mg/l NAA and 10 % CW formed root. Results showed that there are 95% of the buds produced roots with root length of 30-40mm and had 4-6 roots per bud after 4 weeks of culture on WPM medium. The healthy plants (picture 5) were transplanted to pot in ex vitro conditions and reached 12cm plant height after 1 month for further studies. In this study, less shoot and callus formation was observed in cultures on MS. This low shoot, abnormal shoot initiation and low proliferation rate was possibly due to the comparatively high nitrogen con tent of MS. It was observed that cultures on WPM had high proliferation rate, shoots and roots formed simultaneously; therefore, WPM medium would be better medium for micropropagation of sandal wood plant than MS. Micropropagation via meristem culture was favored method in production of sandal wood planting materials.

Reference

1. Chan, Le Mong (1996). Research on planting some precious and rare forest tree species in the arboretum of the forestry college serving the teaching and contributing to gene conservation of tropical tree species in Vietnam. Results of forest scientific and technological research 1991-1995

2. Chanh, Nguyen Trung (1998). Report on rare and valuable forest tree species conservation. Department of Agriculture and Rural Development of Kien Giang Province.

3. Lloyd G. & B. McCown (1980). Commercially feasible micropropagation of mountain laurel, Kalmia latifolia, by use of shoot-tip culture. Comb. Proc. Intl. Plant Prop. Soc., 1981 (30) : 421-426

4. Murashige T. & F. Skoog (1962). A revised medium for rapid growth and bioassays with tobacco tissue cultures. Physiol. Plant. 1962 (15) : 431-497

5. Nghia, Nguyen Hoang (1996). Genetic conservation of forest tree species period 1988-1995. Results of forest scientific and technological research 1991-1995