

## Physiological and Biological Characteristics of Cuttings of Mulberry Trees in Korea (Abstract)\*

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Since 1972 a series of experiments were conducted to reveal physiological function and biological activities involved in rooting of mulberry cuttings, and the behaviour of ether extractable growth control substances in leaves and stems.

Measurements were made on various mulberry varieties for respiration of cuttings, suitable size for the production of cuttings, change of rootability of cuttings with growth of cutting shoots after cutting date, rooting tests on the green beans with ether leaf extract and ether stem extract, and rooting effect of cutting by NAA treatment.

The results of these experiments are summarized as follows.

1. Growth of new shoot and rootability of cutting shoot depend on the cutting level of hard wood before spring sprouting and are best promoted by the basal cutting.

2. No difference in rooting ratio was observed between control and cutting shoot taken from the lateral bud.

3. No relationship was observed between length of cutting shoot and rooting ratio when cutting shoot ranged from 5 to 30cm in length, whereas the number of roots and root weight were positively related to the length of cutting shoot.

4. The number of leaves attached to cutting shoots was related to the rooting ratio. Cutting shoots without attached leaves never rooted, and cutting shoots with one half, one leaf, and two leaves constituted 90% of rooting ratio altogether.

However, cutting shoots with more than 3 attached leaves had decreased rooting ratio.

5. There seemed to be varietal differences between

the quantitative characters of cuttings and their rootability. No correlation was observed between them with the varieties "Nosang" and "Keomji".

On the other hand significant correlation was shown statistically among leaf area and size of cuttings and root weight with Kaeryang-Seoban.

6. Survival rates for the two buds-one internode cuttings (six graded location of 40cm long new shoot with two buds-one internode from the base) has been surveyed for each location.

Survival rates for the cuttings of the second and third location from the base were more than 70%, and 60% for those of the first and fourth location, respectively.

They are far lower than 95% for the survival rate of the control.

7. It is also a noteworthy fact that there was significant correlation between photosynthesis rate of various leaf locations and their rootability. A positive correlation was also observed between length of budding shoot and number of leaves attached to budding shoot.

8. It is evident that there was a varietal difference in rootability according to the photosynthesis rate of the leaves attached to cuttings.

A high photosynthesis rate variety also rooted more actively and diameter of the new roots developed from the cuttings were markedly thicker and larger.

9. It seems that there is no relationship between leaf area and rooting of cuttings. However, 33 varieties tested can be classified into four groups on the basis of rooting ratio; that is below 10%, 10%~30%, 30%~50%, and higher than 50% of rooting ratio. From this fact, the rooting ratio for the variety with large leaf area was lowest and especially the varieties belonging to the species *Morus Lhou* (Ser.) Koidz.

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showed comparatively lower rooting ratio.

10. The C/N ratio of the cutting leaves was higher with the high rooting ratio varieties than with the low rooting varieties after 20 days of cutting, and after then it became lower. The C/N ratio for the high rooting ratio varieties was higher than that for the low rooting ratio varieties throughout the growing period after cutting.

11. Of three varieties tested, the high rooting variety "Keomji" showed most active respiration after cutting, compared to "Nosang" and "Kaeryang-Seoban" do.

12. Growth control substances prepared by extracting leaf and stem were classified according to Rf values, and it seems there are some differences in the profiles of growth control substances between leaf and stem. However it was evident that all Rf values of the substances from leaves and stems of high rooting ratio varieties showed strong activities on the root growth of cuttings, whereas those for the low rooting varieties played an inhibitory role.

On the other hand seasonal change of growth con-

trol substances was observed from the first day to 15 days after cutting, comparing the high rooting ratio variety "Keomji" and low rooting variety "Nosang". In this regard, growth promoting substance in case of "Keomji" was proved to have a high activity continuously until 15 days after cutting, whereas growth inhibitory substance showed a higher activity in the first 15 days after cutting and growth promoting substances increased their activities after 15 days cutting.

13. It was evident that NAA and IAA were the high rooting chemicals as growth promoting substances. Of these, NAA was observed to have the highest rooting effect by dipping the base of cuttings in concentrations of 1,000~2,000ppm for 3-5 seconds.

14. The different rooting effect by NAA treatment was observed according to the species and varieties, and its effect was in order of *Morus alba* L., *Morus bombycis* Koidz., and *Morus Lhou* (Ser.) Koidz. In addition it was also noteworthy that there were varietal differences among the tested varieties of the same species.