

# Prospect and subjects of silviculture training at practice forest of Tokyo University of Agriculture (TUA)

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## Abstract

During the 1970's, there were 24 universities across Japan which had a forestry department. However, the forestry departments have lost their names or changed their name to Forest Science, Natural Resources, Bio-Environment, and so forth. This was done because the new departments have been trying to reform and reorganize themselves to obtain a more efficient curriculum. They have been also pushed by some problems trending at the times, social issues, the forestry business cycles, natural environment consciousness, and also the changing needs of the students. This research focuses on the silviculture training at a practice forest belonging to the Tokyo University of Agriculture (TUA). Silviculture training is a compulsory subject for sophomore students in the Forest Science Department of TUA. This study reports the aim, contents, number of students attending on training, as well as the teaching staff structure. In addition, we surveyed the students who attended the training in 2014 and 2015 and obtained input through a questionnaire directed towards the students. We also discuss the problems and prospects pertaining to silviculture training within a college education system.

**Keywords:** training, silviculture, practice forest, Tokyo University of Agriculture (TUA)

## I. Introduction

There were 24 universities which had forestry departments within Japan during the 1970's. However, the forestry departments have lost their names or changed their names to Forest Science, Natural Resources, Bio-Environment, and so forth. This was done because the new departments have been trying to reform and reorganize themselves to obtain more efficient curriculum. They have been also inspired by some problems trending at the times, social issues, the forestry business cycles, natural environment consciousness, and also the changing needs of the students (1). This research focuses on the silviculture training at a practice forest belonging to the Tokyo University of Agriculture (TUA).

## II. Education of the General Forest Science Department of TUA

TUA is a private university and was established by Takeaki Enomoto in 1891. TUA established a forestry department in 1947 and renewed the name and structure to General Forest Science Department in 1995 (2). The reason for adding "general" is because this new department integrates natural science and the social science fields which relate to forest and forestry. The department has eight laboratories which are Silviculture, Forest Ecology, Erosion Control and Revegetation Engineering, Forest Engineering, Wood Chemistry, Wood Engineering, Forest Management, and

Forest Politics. The annual students capacity is 140, but 20 students transfer into the department on a yearly basis, therefore there are about 160 to 180 students every year.

The compulsory subjects of the General Forest Science Department students are the same across the eight laboratories. These compulsory subjects are: training at the practice forest as a freshman and sophomore, specific major trainings in each of the laboratories in their junior year, and a graduate thesis in the student's senior year. The silviculture training at the practice forest is a compulsory subject for the sophomore students (3).

The practice forest of TUA is located in the town of Okutama in Tokyo. It is located 650 to 1450 meters above sea level and has an area of about 153 hectares.

This study reports the aim, contents, student attendees in one training session, and the teaching staff structure. In addition, we utilized a questionnaire to survey the students in 2014 and 2015. We will then discuss the problems and prospects of silviculture training at the university level.

## III. Silviculture training

The purpose of silviculture training is to learn the elements of silviculture through practical means within a forest. The contents of the training are shown in Fig.1 to Fig.7.

The students are divided into three groups (approximately 60 students in each group), during TUA's summer vacation in a single group of 60 students are divided further into 10

practice groups. Each of the 10 practice group has 3 instructors (2 professors and 1 associate professor). In addition to this there are 10 graduate or senior students to support the students and teaching staff.



Fig. 1. Surveying plot setting (15 × 15 meters square)



Fig. 2. Surveying each tree

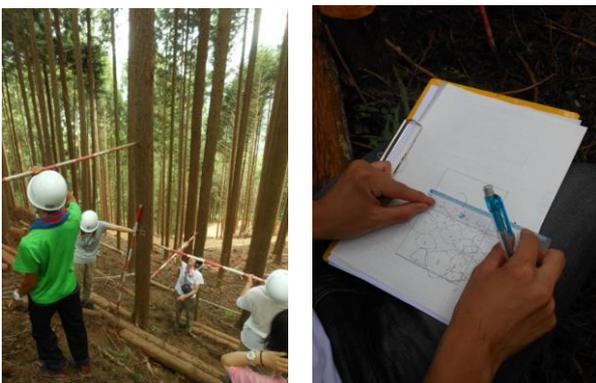


Fig. 3. Tree crown shadow drawing (1/100 scale)

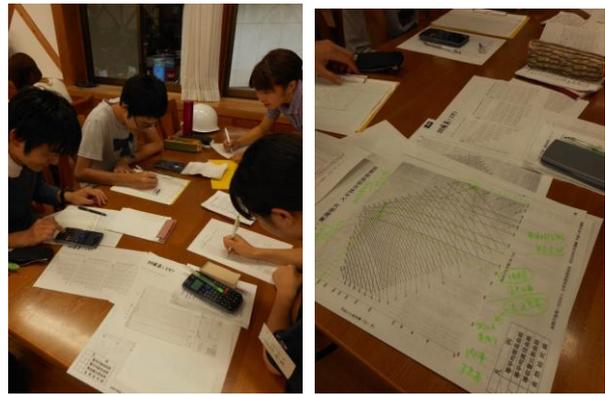


Fig. 4. Density control calculation and designing



Fig. 5. Tree identification and examination



Fig. 6. Researching soil cross surface



Fig. 7. Thinning cutting training

#### IV. Questionnaire about silviculture training

We asked the questions listed below (Table 1) following each of the silviculture trainings from 2014 and 2015. In total we obtained 352 valid responses (182 in 2014, 170 in 2015).

Table 1. Questionnaire

1. What was the most interesting training?
2. What was the most easiest training to understand
3. What was the most difficult training?
4. How many people are suitable for a single group?
5. Which training best applies to your department?

#### V. Results of the questionnaire

The result of “what was the most interesting training?” is shown in Fig.8.

Students answered that the thinning cutting practice was the most interesting training out of the performed trainings.

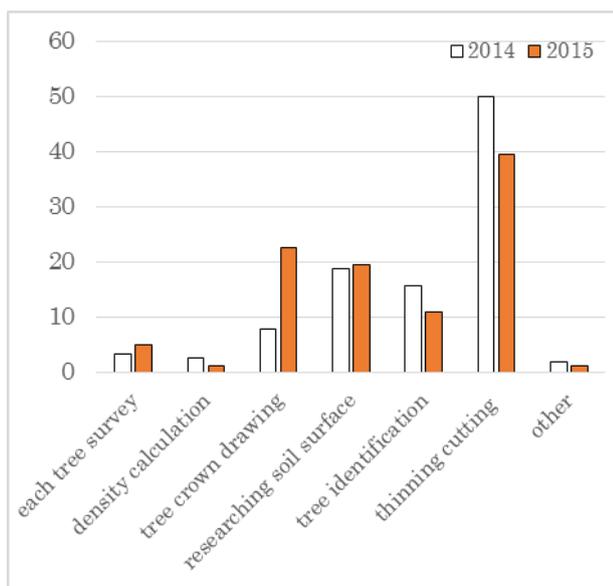


Fig. 8. “What was the most interesting training?” (Response %)

Next, the result of “easiest training to understand” is shown in Fig.9.

Students equally identified the three trainings that were “the easiest to understand”, were tree crown drawings, tree identification, and thinning cutting practice. On the contrary, each of the tree survey show that DBH, tree height, researching soil surface, and density calculation, harder to understand.

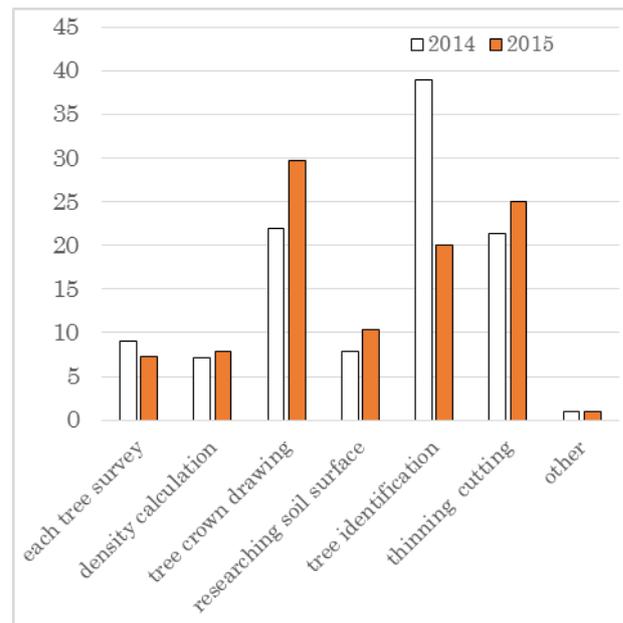


Fig. 9. “What was the easiest training to understand?” (Response %)

Third, “the most difficult training” is shown in Fig.10. Tree identification was identified as the most difficult training. More than 1/3 of the students answered that this training was difficult. Following this, researching soil surface, density calculation, and tree crown drawings were also identified as difficult by the students. Each tree survey was low in the categories of being understandable and being difficult.

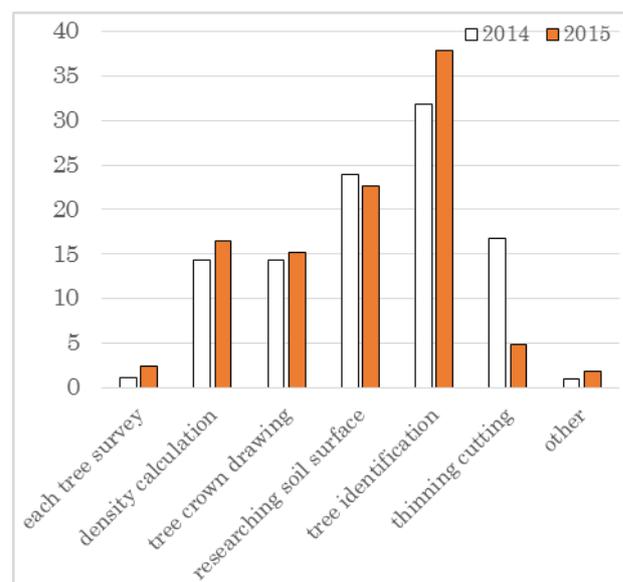


Fig. 10. “What was the most difficult training” (response %)

Fourth, the number of suitable group members is shown in Fig.11. Most of students answered that 6 or 5 members are suitable for a group. The percentage of 3 or 4 members for suitable group were extremely low.

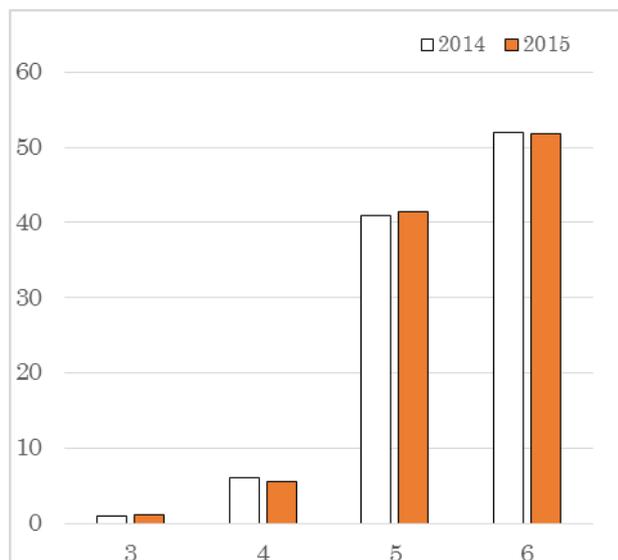


Fig. 11. "How many people are suitable for a single group?" (Response %)

Fifth, "Which training best applies to your department" is shown in Fig.12.

Tree identification was the biggest response and more than 30% of the students reported it was useful. Following this, from most useful were, thinning cutting, tree crown drawings, and researching soil surface were reported. Both tree survey and density calculation were low in this questionnaire.

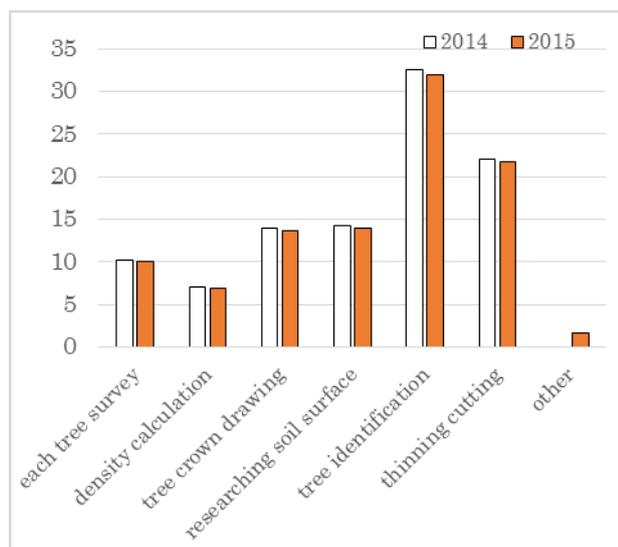


Fig. 12. "Which training best applies to your department?" (Response %)

## VI. Discussion

The results of the questionnaire show the students' impressions of silviculture training within a forest, but the questionnaire also provided vague impression from the students. Furthermore, they suggest the difficulties of understanding the total image of silviculture. It has been pointed out that silviculture and forestry are difficult to teach and learn practically and inclusively (4) (5). Especially, forest trees need long time to grow, so we must have long-term point of view. Therefore, to consider silviculture, students need long-term point of view and organical thinking to combine plural matters. Going along with this, the learning result varied greatly on individual level. Students with active and positive attitudes able to understand the meaning of the training; however students with negative and passive attitudes are unable to form a clear image of silviculture. In addition, the teaching staff needs to control and manage a large group which has more than 60 students. There are the basic problems which are a part of the practice forest training program at TUA. Treatment practice, such as weeding, pruning, cleaning the forest floor, is not practiced presently. Lack of a suitable practice place and tools for each student, as well as avoiding danger are the main factors which prevent this treatment practice at TUA.

However, we have to annually reconsider, reform, and renew the contents of the training to help students learn silviculture practically and effectively. The results illustrate the best approaches to design an effective curriculum for both the students and faculty.

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