論　文

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Case study of campus practice as an alternative forest practice responding COVID-19

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COVID-19 has been spread out world widely since it had been reported in Wuhan city in China in 2019. It has brought various limitations in our daily lives and it has given negative impacts on schools and campus lives, too. Therefore, educational society has mainly taken measures website delivery learning materials against COVID-19. In these sequences, forest departments of Japanese universities have also planned alternative practices of field practices. This study showed a case of campus practice as an alternative forest practice and considered the effects at Tokyo University of Agriculture. Totally 130 students were belong to 6 groups (approximately 20 students each) and each groups were divided to 5 training teams (4 students each) to keep physical distance. Contents of the practice were every tree survey (tree height, diameter at breast height: DBH), canopy projection drawing, soil cross section drawing, soil hand sorting, and tree identification on campus. These alternative practice showed some problems that were lack of dynamic forest practices such as thinning, making soil cross section, differences between forest tree species (*Cryptomeria japonica* and *Chamaecyparis obtusa*) and green planting species(*Zelkova serrata* and *Ginkgo biloba*), stand density, and so forth.
Key word: COVID-19, campus practice, alternative forest practice, silviculture, sophomore students

新型コロナウイルス対応のため、演習林実習を構内実習で代替した事例

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要旨：新型コロナウイルス（COVID-19）は、中国・武漢市で報告されて以来、2020 年には全世界に拡大し、日常生活における様々な制約をもたらしている。各学校においてもその影響を受け、配信教材による在宅学習などの対応が行われている。このような状況下で、大学の森林関係の学科においても野外実習の代替措置などが検討されている。本研究では、通常の演習林実習を大学構内での実習に代替し、その実習効果についての検討、考察をおこなった。大学構内での実習は、約 130 人の受講生を最大 20 人のグループに分け、さらに 4 人ずつ 5 つの小班に分けて、フィジカルディスタンスを確保して実施した。実習内容は、構内の緑化木を利用しての毎木調査（樹高、DBH）、立木密度計算、土壌のハンドソーティング、樹木検索などである。実習の課題としては、森林土壌の断面作成や間伐作業などのダイナミックな体験ができなかったことを筆頭に、構内の緑化木（ケヤキ、イチョウなど）と林地での植栽木（スギ、ヒノキ）および天然更新樹木との差異、立木密度の違いなどがあげられた。
キーワード：新型コロナウイルス、構内実習、演習林実習の代替実習、造林学、大学２年生

Ⅰ. Introduction

Forest training is one of the important programs in the forest science departments and every university which has department of forestry or forest science practices forest training (*1*) (*5*) (*6*).

Department of Forest Science of Tokyo University of Agriculture has also practiced “Forest training” as a requirement subject for freshman and sophomore students every year (*2*) (*3*). About 130 students annually attend on each training. Forest training on sophomore is mainly consisted of silviculture training curriculum. The training is practiced by dividing three groups. Students attend the training in 3 days 2 nights in each groups during summer vacation. Students practice every tree survey (tree height, diameter at breast height: DBH), volume calculation, canopy projection drawing, soil cross section drawing, tree identification, and thinning cut on the training days (*4*).

However, COVID-19 has been spread out world widely since it had been reported in Wuhan city in China in 2019. It has

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brought various limitations in our daily lives and it has given negative impacts on schools and campus lives, too. Therefore, educational society has mainly taken measures website delivery learning materials against COVID-19. In these sequences, forest departments of universities and colleges have also planned alternative practices of field practices. Especially, most of practice forests were closed and forest departments needed to search alternative places and practice setup.

This study showed a case of campus practice as an alternative forest practice and considered the effects in the Tokyo University of Agriculture in 2020.

Ⅱ. Site and method

Tokyo University of Agriculture is located in Setagaya-ward of Tokyo. We surveyed students' reactions and consciousness about forest training on the Setagaya campus. Totally 130 students attended the training. Students were divided to 6 groups (approximately 20 students each) and each groups were divided again to 5 training team (4 students each) to keep physical distance.

Contents of the practice were every tree survey (tree height, diameter at breast height: DBH), canopy projection drawing, soil cross section drawing, soil hand sorting, and tree identification by utilizing campus environment. Every tree survey and canopy projection drawing, and volume calculation utilized planting trees such as *Ginkgo biloba* or *Zelkova serrata*. Campus green area was utilized for soil cross section drawing. Students practiced the drawing by 20cm deep.

We surveyed the students' reactions and consciousness by a questionnaire as Table 1 after the practices. Totally 113 valid answers were retrieved. We compared the data by same questionnaire in 2019 practice, too (*4*).

Table 1. Questionnaire

1. What was the most interesting training?
2. What was the most understandable training?
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?

Ⅲ. Results

The answers of "what was the most interesting training?" are shown in Fig.1.

33% students answered that the every tree survey practice was the most interesting training out of the performed trainings. Sequentially below, soil cross section drawing (25%), tree identification (20%), and tree crown drawing (18%) were followed. Volume calculation was chosen by only 4%.

Next, the answers of "the most understandable training" are shown in Fig.2.

33% students answered that the every tree survey practice was the most understandable training out of the performed trainings. Sequentially below, tree crown drawing (23%), tree identification (19%), volume calculation (17%), soil cross section drawing (12%) were followed. There was no training which was estimated extremely little.

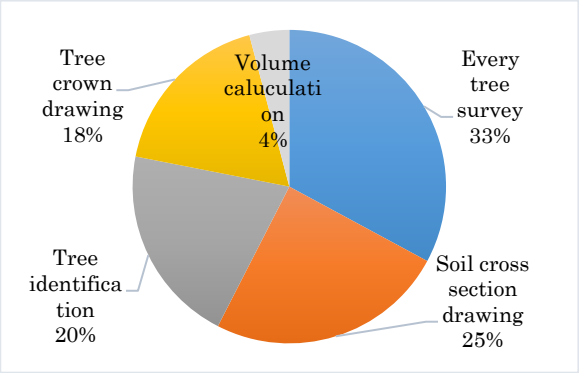

Fig.1. "What was the most interesting training?"
(Numbers %)

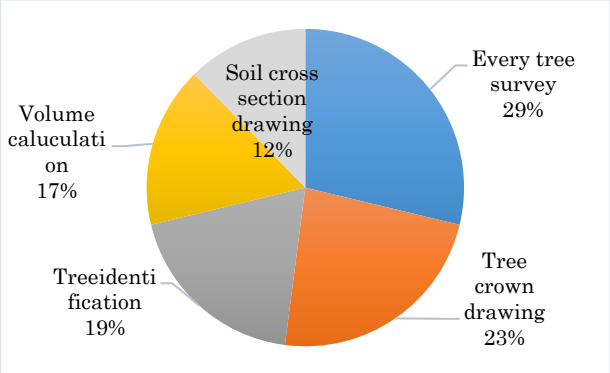

Fig.2. "What was the most understandable training?"
(Numbers %)

Third, the answers of "the most difficult training" are shown in Fig.3

Volume calculation was estimated as the most difficult training. Sequentially below, soil cross section drawing and tree identification (26% each) were followed. Both of tree crown drawing (10%) and every tree survey (5%) were estimated not difficult so much.

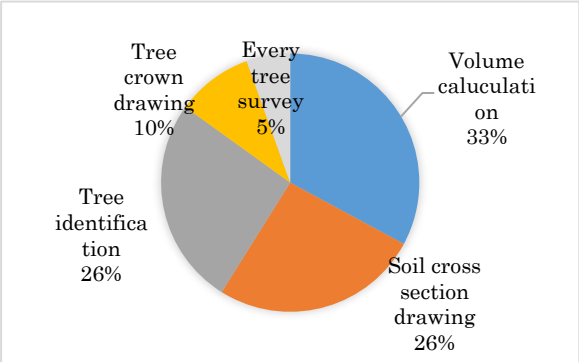

Fig.3 “What was the most difficult training” (Numbers　%)

The number of suitable group members is shown in Fig.4.

Most of students answered that 4 members are suitable for a group (82%). It suggested that even number members are suitable to practice, too.

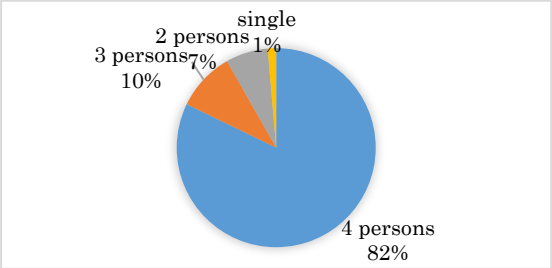

Fig.4. “How many people are suitable for a single group?” (Response　%)

The answers of “Which training best applies to your department” are shown in Fig.5.

Tree identification was the biggest response and more than 40% students reported it was useful. Sequentially below, every tree survey (23%), soil cross-section drawing (13%), volume calculation, and tree crown drawing (11% each) were followed. In this question, there was no training which was estimated extremely little, too.

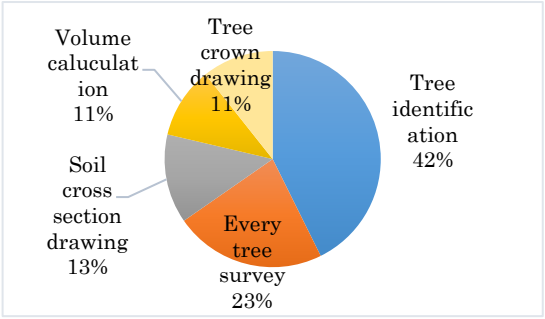

Fig.5. “Which training best applies to your department?” (Numbers　%)

VI. Discussion

After practices on campus in 2020, students answered that every tree survey was the most interesting and understandable training, volume calculation was the most difficult training, and tree identification was the best apply to own department. However, these results were quite different with the results of utilizing practice forest in 2019 (*4*). The results by same questionnaire after the forest practice in 2019 are shown on figure 6 to 10 (*4*). Totally 137 valid answers were retrieved.

Thinning cutting practice was the most interesting training out of the performed trainings in 2019.

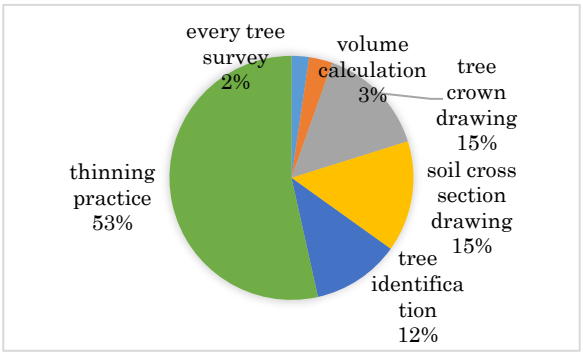

Fig.6. 2019 students’ answers for “What was the most interesting training?” (Numbers　%)

Students answered thinning practice, tree identification, tree crown drawing, soil cross-section drawing were understandable. Nevertheless, thinning practice was the highest estimation on this question, too. This result suggested that most of the students had no experiences of tree cutting. In addition, 2020 students had no thinning cut training experience. This difference of the experience must have big difference to the students.

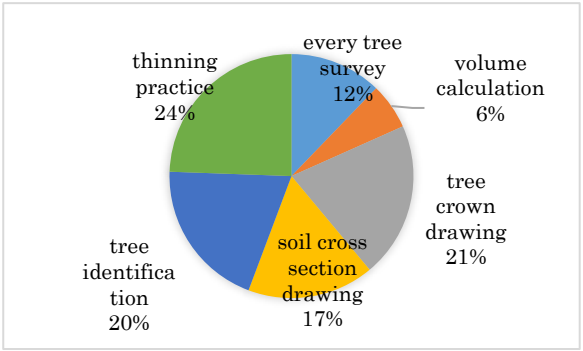

Fig.7. 2019 students’ answers for “What was the most understandable training?” (Numbers　%)

37% students answered that tree identification training was the most difficult in 2019 practices. However, in 2020, 26% students answered it was difficult. This difference might be

caused by the difference of the tree species on campus and in the practice forest. 2019 students identified volume calculation and soil cross-section drawing were difficult, too. Especially, reading a stand density control figure was difficult to understand for the many students in 2019.

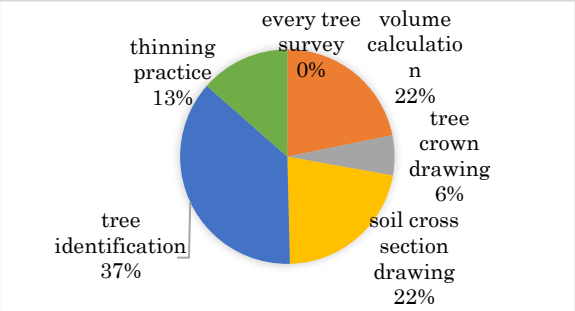

Fig.8. 2019 students' answers for "What was the most difficult Training?" (Numbers %)

In 2019 practice, students' small group was mainly consisted of five members. Therefore, students must answer five or four.

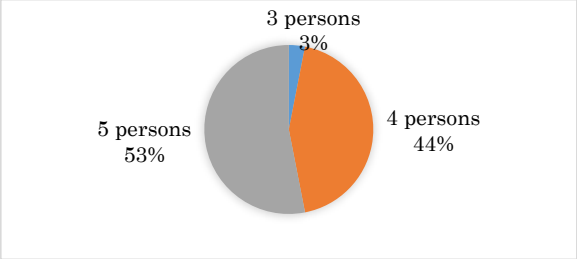

Fig.9. 2019 students' answers for "How many people are suitable for a single group?" (Response %)

37% students in 2019 answered tree identification was difficult. However, 38% students estimated that it was very useful in forest science department, too. These contradictory results suggested that tree identification must be estimated as important training. In addition, 2020 students estimated tree identification training was useful, too.

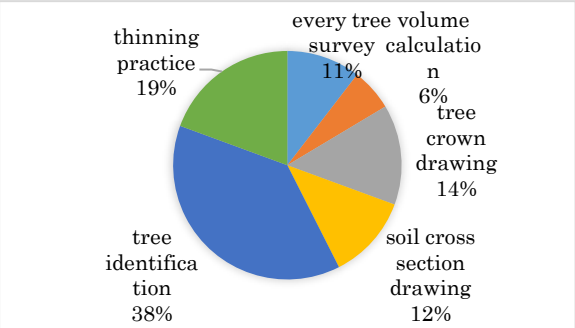

Fig.10. "Which training best applies to your department?" (Numbers %)

Free answer writing showed that many 2020 students would like to practice at Okutama practice forest. Their main reasons are that 2020 practice was run without two dynamic training that were forest soil cross section drawing and thinning cut practice. In each year, students make soil cross section with one meter deep and thinning training at artificial conifers stand by each training group. However, these dynamic practice could not been done on campus. The alternative practice showed other problems that were differences between forest tree species and green planting species and their stand density.

On revised practice views, if this on campus practice without staying at practice forest, it needs to find another suitable training area where students can go to by day trip and they can train cutting trees and digging forest soil dynamically. Furthermore, the practice place should have forest or plantation tree density and the tree species, too. On campus practice in 2020, we utilized planting trees such as *Ginkgo biloba* and *Zelkova serrata*. But these trees were planted for campus greening and the planting density is quite lower than artificial conifer stands such as *Cryptomeria japonica* and *Chamaecyparis obtusa*. This problem was concerned with volume calculation, too.

Conclusion

We attempted this practice on campus under the COVID-19 situation in 2020. However, the students' estimation showed some problems as it expected. Therefore, we need to keep searching the better sights and methods in COVID-19 circumstances.

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