

The Current Situation of the Experimental Farms in the Teacher Training Universities in Relation to the Aim of Possible Increase in Use of Living Materials

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This paper deals with some close examination on the current situation of the experimental farms of 24 national universities which are responsible for the school teacher-training. From the results, reorganization of the farm is proposed in order to have more adequate and extensive use of it. On the other hand, the field animals and plants in the farm of the Osaka Kyoiku University were examined. And, what purpose these living things and cultivated plants could be available for were discussed. Necessity of the study on development of multipurpose use of some living materials in the teacher training university was also discussed.

I Introduction

In Japan, teacher training system was changed to be done through four years course of the university or college by the time just after the Second World War (1949). During the early years after this change, almost of such universities and colleges had the division of vocational education called *Shokugyo-ka* which concerned with agriculture and/or technology teacher training and the experimental farm was actively used mainly by the division. As the socio-economic situation has changed during the recent 20 years, the division has been also regulated to be much smaller size or transformed as the division of technology teacher training in many universities and colleges. This situation has led the students to give much poor use of the experimental farm[1,2,3]. However, use of the farm should not be regarded only as the place for giving the practice of crop science as one of the required subjects for the students of the technology teacher training, but estimated as the appropriate place where the all students who want to be teacher at any level of schools could have an opportunity to understand some feature of nature which might be closely related with the natural, social and cultural activities of human being. Under the situation, it seems to be necessitated that reconsideration about the aim and use of the experimental farm in the teacher training universities and colleges. With the aim, first we have prepared the questionnaire including some items concerning administration, education and research matters, and asked all national teacher training universities and colleges of Japan to give the answers to these matters. Second, the present situation of the experimental farm of our university is given here, especially with respective matter of education and research. This paper deals with these two points and some related aspects.

II Present Situation of the Experimental Farm

The questionnaire was composed of the following items : 1) Do you have experimental farm or any related field-institution. 2) The area of the farm and that of buildings including some other facilities. 3) Number of full-time and additional-post educational and/or research stuffs and technical officials. 4) Manner of operation of the farm-administration. 5) Using purposes

such as subjects of study for students and the research subject of stuffs, the number of students together with their course and major (specialized) division they belong to, and the times of uses for an academic year.

The questionnaire was sent to the Faculty of Education of all 51 National Universities and Colleges which are concerned with teacher training, and the answer was given from 28 ones among them. They are the Faculty of Education of Hokkaido Kyoiku Univ. (including three Branches of the Faculty), Iwate Univ., Fukushima Univ., Ibaragi Univ., Tokyo Gakugei Univ., Yokohama National Univ., Yamanashi Univ., Shizuoka Univ., Toyama Univ., Fukui Univ., Aichi Kyoiku Univ., Gifu Univ., Mie Univ., Shiga Univ., Nara Kyoiku Univ., Osaka Kyoiku Univ., Wakayama Univ., Kobe Univ., Okayama Univ., Tottori Univ., Shimane Univ., Kagawa Univ., Ehime Univ., Fukuoka Kyoiku Univ., Saga Univ., and Miyazaki Univ. Out of them, 24 faculties have the experimental farm and two of which have the experimental forest also. The following description was based on the answer from the 24 faculties. The results of the answers were summarized into three Tables according to their contents.

Table 1 Size and management of the experimental farms

A. Areas of the farm and building

Area of the farm (m ²)	No. of Faculties	Area of the buildings (m ²)	No. of Faculties
less than 1000	3	0	1
1001 ~ 5000	10	1 ~ 100	6
5001 ~ 10000	2	101 ~ 300	8
10001 ~ 20000	7	301 ~ 500	3
20001 ~ 30000	1	501 ~ 700	4
more than 30001	1	more than 701	2
Total	24	Total	24
Average 7879		Average 303	
Maximum 33421		Maximum 920	
Minimum 400		Minimum 0	

B. Number of the farm-engaging stuffs

Kind of stuffs	Number of the Faculties according to the distribution of the stuff-number						
	0	1	2	3	4	5	6
Educational or research stuff ¹⁾	8	9	4	2	0	0	1
Technical officials ²⁾	6	8	10	3	2	0	0
Clerical employees ²⁾	19	4	0	0	1	0	0

1) Only two Faculties had one full-time stuff. Other Faculties answered engagement of additional post-stuff.

2) In these numbers the both cases of full-time and additional post were included.

C. Manner of administration

Manner	No. of Faculties
Personal engagement of a few definite stuffs of the related field	8
Director selected from the related research division	8
Committee chairman	8

Size and management of the experimental farm. As is known from the column A of Table 1, area of the farm and that of the buildings are markedly varied. The column B of this Table, on the other hand, showed that many faculties do not have any full-time and additional-post stuff for the farm. This means that the condition of the farm and the research activity are kept by very few people (they are mainly educational stuff for agriculture and/or biology), although the average area of the farm is not so small. This rather poor condition of the farm seems to reflect in its administration. Keeping of the farm is dependent upon the personal engagement of a definite stuff in the one third of the faculties (column C), in spite of active use for many subjects of study as will be mentioned later. This situation gives us a certain astonishment. Size of the farm in the Faculty of Education is generally not so big, but having the farm in the faculty should have something important more than actual purpose of using. Many of university students in these years do not know how to observe feature of nature and why human being should appreciate the importance of land-cultivation as well as keeping of the wild nature. Teachers should be expected to learn about these matters both in experience and science. For this purpose, the experimental farm is the only place in the campus. Certain regulation including financial support is urgently necessiated. The further description will concern with some details of the present situation and the problems of the farm.

For what purposes the experimental farm is used. The present situation of the farm-using is summarized in Tables 2 and 3. In order to help understanding these tables, we shall add in foot note an outline of the educational and research organization for teacher training in the Faculty of Education of Japanese universities (see the foot note in the next page).

The specialized divisions which have frequently utilized the farm are those of natural science, vocational education (or technology, agriculture), infant education, home economics. But, in 9 faculties the farm is used only by one division, that is, the division of technology and/or agriculture in 8 faculties and that of natural science in one faculty. Farm-using by the plural division is most frequently answered, i. e., 2 divisions for natural science and for technology and/or agriculture in 5 faculties, and more than 3 divisions in 14 ones. The number of subjects of study which have come out by using the farm is distributed from 1 to 8 with an average of 3.7, although it is restricted within 4 in two-thirds (17) of the faculties. The times of uses for these subjects is widely differed from several to 60 times for an academic year. The similar maked variation is also seen for the number of students who have used the farm (use of less than 100 students appears in about half number of the faculties and that of more than 500 ones is in a few faculties). It is pointed out, however, that how many students have used the farm seem to have no relation with the full-number of students of respective faculty. This means that the using-situation such as the number of students, that of subjects of study and the times of uses

Table 2 Present situation of the use of the experimental farm

A	Distribution of the no. of courses and divisions using the farm	1	2	3	4	5	6	7	Total	
	No. of Faculties	9	5	2	4	2	1	1	24	
B	Distribution of the no. of the subjects of study using the farm	1	2	3	4	5	6	7	8	
	No. of Faculties	5	3	3	5	2	1	1	2	24
C	Distribution of the no. of the students using the farm	1-10	11-50	51-100	101-200	201-300	301-500	more than 500	uncertain	
	No. of Faculties	3	10	1	2	4	0	2	2	24

may be effected by some difference in educational and research programme of each university.

Details of the contents of the farm-use are given in Table 3. Both divisions of natural science and vocational education showed the most frequent use of the farm. "Division of vocational education" referred here is somewhat different in naming for each faculty. It is the division of technology (many of them include the part of crop science or agricultural study) for 15 faculties, the division of vocational education (mainly concerns with agricultural study) for 5 ones, and the division of vocational and technological education (includes agriculture) for 3 ones. Such naming difference is due to the main part of education and research. But, the all provide one or more subjects of study which are indispensable to use the farm and one third of them uses the farm more actively for graduation thesis.

The similar situation can be seen also in use by the division of natural science. Using the farm, graduation thesis and all other subjects of study are carried out by the students who are specialized in biology study on the one hand, and some general biology experiment and study of teaching materials are also given to all students who belong to the elementary school teacher training course and who are specialized in study of a definite field of natural science other than biology on the other hand. Certain subjects of restricted fields of biology are prepared for the students who belong to the upper or lower secondary school teacher training course and who are specialized in biology study.

Besides general education subjects, the purposes of the farm-use in other course or division are primarily to give the students some experiences to contact with nature by such means of observing, touching, sketching and collecting of the living things (including study of teaching materials). This situation shows how the farm can be used with a variety of purposes. Looking both the times of use and the number of subjects of study, however, it is apparent that the number of faculties that has valuably used the farm is not so many. A variety of using purposes and some limitation of using-time are a contradiction each other.

Seeing the answers to our questionnaire, almost faculties have a hope and expect more

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- 1) Teacher training in Japan is mainly carried out at the Faculty of Education of 51 national and some private universities and colleges, and about one fourth of them have post graduate course for Master degree. Applicants for admission to the Faculty are allowed to enter into some different courses through the entrance examination. Number of courses is somewhat different for each faculty. Almost of the Faculties have such courses that are for teacher-training of (1) elementary school, (2) lower secondary school, (3) upper secondary school, (4) kindergarten, and many of them also provide (5) nurse teacher training course and (6) several courses for special education such as deaf, mentally retarded, physically handicapped, speech handicapped and others. For the first one or two years after entrance, all students should be obliged to learn mainly the general education subjects regardless of their course. After taking the definite number of units of the subjects they will enter further to the specialized division of each course. For the students of the former 3 courses, these are about 10 divisions in which they can have major subjects to study more deeply (in the later description the division is arbitrary called "division of major study of subjects" and abbreviated as DMSS or MSS). These are Education (Pedagogy and Psychology), Social Science (subdivided into 4 or 5 MSS), Literature and Language (Japanese and English), Mathematics, Natural Science (subdivided into 5 MSS), Technology, Home economics, Health Science, Physical Culture, Music (5 MSS) and Arts (4 MSS). Educational and research stuffs belong to each division, so that the division is a primary unit in the activity of education and research, then called Department.

Table 3 Purposes of the farm-use (Numeral given below indicates the number of the faculties or schools using the farm for each item)

In Faculty of Education			
Division of Natural Science ¹⁾		Course for Infant Education	
Graduation thesis	8	Graduation thesis	2
Biology experiment	6	Study of nature	4
Study of teaching materials	4	Division of Home Economics	
Plant taxonomy	2	Graduation thesis	2
Genetics experiment	2	Study of teaching materials	2
General botany experiment	1	Division of Nurse-Teacher Training	
Ecological practice	1	Practice for farm activity	1
Practice for farm activity	1	Division of Arts ²⁾	
Some practice in biology	1	sketching	4
Division of Vocational Education (technology, agriculture etc.) ³⁾		General education subjects	
Graduation thesis	8	Biology practice	1
Crop science and practice	18	Cultivation of living things	1
Study for agriculture	15	Cultivation and horticulture	1
Horticulture	2	Agriculture and science	1
Subjects of educational study for seminar for the part of agriculture education	1	Course for primary teacher-training (not included the students who intend further specialized study in natural science)	
		Cultivation of living things	1
		Study of teaching materials other than the subjects of natural science	5
In Other Faculties			
Practice of land surveying in Faculty of Engineering			1
Practice of agriculture in Faculty of Agriculture			1
Schools Attached to the Teacher Training University			
In primary school		In secondary school	
Field practice	6	Field practice	2
Supply of teaching material	2	In kindergarten	
Field working practice	1	Experience in field	6
		Nature education	1
Visiting-Use from Other Schools and Citizen's Group			
Field experience of nursery school			1
The same of kindergarten			3
The same of primary school			2
The same of nurse school for weak children			1
Citizen's groups for nature protection			1

- 1) Each student of the division comes from either course of teacher-training for elementary, lower secondary or upper secondary school.
- 2) Each student of the division comes from that for the first two of those mentioned just above.
- 3) Every student of this division comes from the course for training lower secondary teacher.

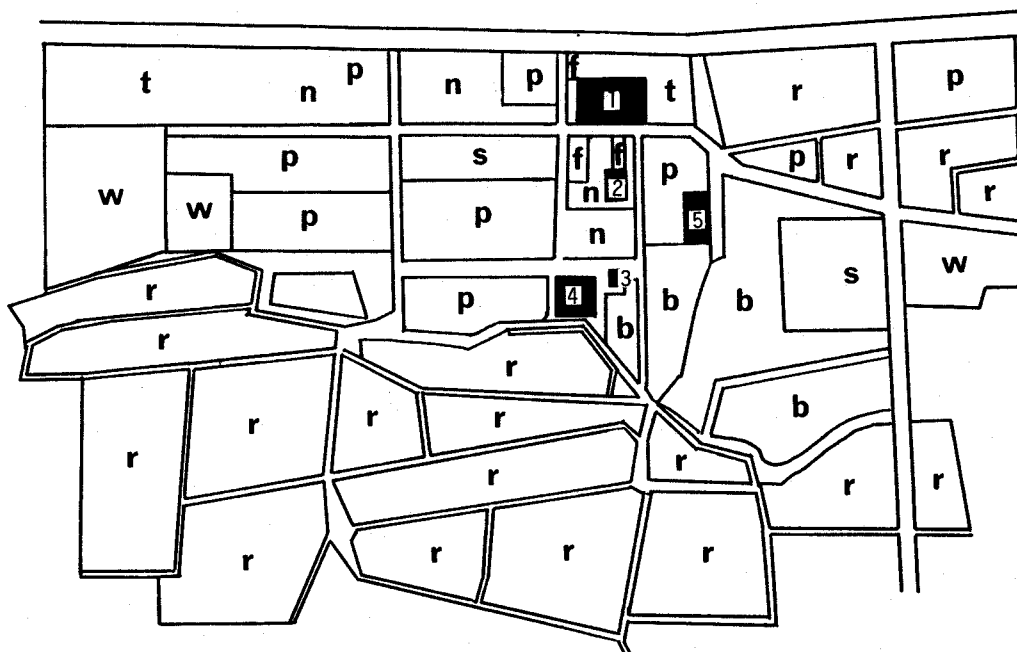


Fig. 1. Map showing the divisions of the experimental farm and their use. Numerals 1 to 5 indicate office, greenhouse, house for compost, storehouse and laboratory, respectively. Alphabetic indications are as follows: b is for bamboo thicket, f for frame, n for nursery trees, p for plants using as teaching materials, r for paddy field, s for sweet-potato field, t for tree garden, and w for experimental farm for wheat.

available and extensive use of the farm if some financial support and supply of the full-time staff are given. Table 3 shows, on the other hand, the farm is used by the children, pupils of many school and even by the citizens. Why and for what they want to come the farm should be reconsidered. This is another important matter other than the purpose of the farm-use in the university.

III An example of use of the experimental farm

In this chapter, we shall describe some details of a case of the experimental farm in Osaka Kyoiku University. The farm is located in Habikono City, southern part of Osaka Prefecture, and has been established as an experimental farm of Tennoji Normal School (Teacher Training College) in 1942. After this college was raised to the status of university with four years teacher training course, the farm was efficiently used as a place of practice for the students whose major subject of study was for agriculture and/or technology in the division of vocational education. In 1963 this division was transformed to that of technology, and the farm was also reorganized as the garden for study of teaching materials with an expectation of using for more wide purposes. Fig. 1 is an illustrated map showing the current situation of use of the farm, which covers an area of about 30000 m², containing 12000 m² of cultivated land using both for research and teaching materials. Since then, the actual situation of the farm-use, however, was not so markedly changed: the farm has been mainly used by the students of both divisions of natural science and technology. It has had an important role both for educational and research activities of the staffs and students of the division of natural science, but has showed decreasing tendency for the students of the division of technology as in many other universities(3).

Fauna, flora and cultivated plants. There were found many vertebrate and invertebrate species. Among them, we could identified 12 species of spiders, 15 of butterflies, 7 of land shells and 5 of amphibians. As to the plants, 177 species (140 genera of 69 families) were collected (4a, b). Seasonal variation of the animals and plants and utilization for some subjects of study will be reported in the Memoirs as the continuing study of the present paper.

One of the most important activities of the farm is to keep some cultivated plants. About 500 genetic strains of wheat or its relatives are well maintained (4c). Sweet potato (16 cultivars), *Avana* (15 species) and single cultivar of other crops such as rice, pea, onion, corn, potato and some others are also preserved. Such richness of living plants will seem to make extensive possibility in using of materials for the variety of subjects. From this point of view, the present situation of using these living materials may be rather restricted, because of limitation in number of engaging stuffs and less financial support. However, we would like to describe some details of the farm-use in the following. This may be useful to see further possibility how and for what purpose the living materials can be used in the farm.

Living materials and the purposes of their use. Table 4 gives list of the subjects of study according to the respective live teaching materials which were used in the field or laboratory works of our university from 1976 to 1981. Purposes are different according to the course and the specialized division which the students select for. The division of natural science have used most frequently these materials. Average number of the students of the division per year from 1976 to 1981 was 130 (80 for elementary school teacher training course, 20 for lower secondary one, and 30 for upper secondary one). We should see further what material was used for what subjects of study for respective course. The farm was used as follows. First is the subject of biology experiment which is prepared as one of the fundamental programme of curriculums for the elementary school teacher training course (ES). The contents provided so far were rice planthing, sweet-potato cutting and examination of plant community using a quadrat method in the first semester (April to September), and mowing of rice-plants, sweet-potato digging and comparison of the productive structure of goldenrod with that of Japanese pampas grass using a stratified clip method in the last semester (October to February) (Fig. 2). Second is the subjects of biology experiment I and laboratory exercise for genetics which were given as fundamental programmes for biology for the lower secondary school teacher training course (LS). And, third is three specialized subjects of study (practice of anatomy, laboratory exercise for genetics and practice of ecology) for the upper secondary school one (US). In the laboratory exercise for genetics, the contents were crossing and observation of segregation of the gene using wheat and corn, and learning evolution of wheat by observation of spikes of pure lines. In addition to these, some practices for taxonomy and ecology were also carried out in the farm. Main materials used here were more than 100 species of plants, benthos, plankton, fishes in pond and some animals such as ants, wood louse and earthworms.

On the other hand, the division of technology used the farm only for the subject of study, crop science to which about 10 students of the lower secondary teacher's course should be obliged to study every year.

Besides these practices in the farm, some subjects of studies are able to carried out in the laboratory by using the materials which are cultivated and collected in the farm. For example, wheat, onion and leek are adequate for the observation of mitosis and/or meiosis and for the cytochemical experiment. Camellia and spiderwort are quite useful for the morphological and physiological subjects (cf. Table 4).

Table 4 List of the living materials and the purpose of their use for each course during the years from 1979 to 1981

English name (Scientific name)	Purpose of exercise for	Subject of study in curriculum for (each course*)
Plants		
Pond scum (<i>Spirogyra</i>)	Observation of chloroplasts	Biology experiment (ES) Biology experiment (NE)
Ginkgo (<i>Ginkgo biloba</i>) and Pine (<i>Pinus thunbergii</i>)	Seeing the characteristics of gymnospermous plants	Biology experiment (ES) Biology experiment I (LS) Practice of anatomy (US)
Rescue grass (<i>Bromus catharticus</i>)	Seeing the characteristics of Gramineae	Biology experiment I (LS) Practice of anatomy (US)
Rice (<i>Oryza sativa</i>)	Having the experience of rice- planting and -mowing	Biology experiment (ES) Crop science (LT)
Dandelion (<i>Taraxacum japonicum</i> , <i>T. officinale</i>)	Comparison of two species Seeing the characteristics of Compositae	Biology experiment (ES) Biology experiment (ES) Biology experiment I (LS) Practice of anatomy (US)
Wheat (<i>Triticum monococcum</i> , <i>T. dicoccum</i> , <i>T. aestivum</i> , <i>Aegilops speltoides</i> , <i>Ae. squarrosa</i>)	Understanding the idea of evolution of wheat	Biology experiment (ES) Biology experiment (NE) Laboratory exercises for genetics (LS, US)
	Observation of cell division (mitosis and meiosis)	Biology experiment (ES) Laboratory exercises for genetics (LS, US)
	Seeing the effect of γ -ray irradiation on mitosis and the chromosome aberration	Laboratory exercises for genetics (LS, US)
	Observation of pollen grains	
	Observation of cytoplasmic inheritance	
	Understanding Mendelian inheritance	
	Crossing	
Sweet potato (<i>Ipomoea batatas</i>)	Having the experience of sweet-potato cutting and digging	Biology experiment (ES) Crop science (LT)
White clover (<i>Trifolium repens</i>)	Understanding the idea of multiple alleles (inheritance of chevron pattern on the leaves)	Biology experiment (ES) Laboratory exercises for genetics (LS, US)
Sour sorrel (<i>Rumex acetosa</i>)	Seeing the sex ratio in natural population	Laboratory exercises for genetics (LS, US)
	Observation of sex chromosome	
Japanese pampas grass (<i>Miscanthus sinensis</i>) and Goldenrod (<i>Solidago altissima</i>)	Comparison of the productive structure by stratified clip method	Biology experiment (ES)
Onion (<i>Allium cepa</i>)	Observation of cell structure	Biology experiment (ES) Biology experiment I (LS) Biology experiment (NE)

Continued from the previous page

	Observation of mitosis	Biology experiment (ES) Laboratory exercises for genetics (LS, US)
	DNA and RNA staining with methylgreen and pyronin	Laboratory exercises for genetics (LS, US)
	Histone staining of nucleus with fast green	
Leek (<i>Allium fistulosum</i>)	Observation of mitosis and meiosis	Laboratory exercises for genetics (LS, US)
	Observation of chromosome aberration	
Camellia (<i>Camellia japonica</i> , <i>C. sasanqua</i>)	Anatomy of leaves and vascular bundle	Biology experiment (ES) Biology experiment I (LS) Practice of anatomy (US)
Spider wort (<i>Tradescantia reflexa</i> , <i>T. paludosa</i>)	Observation of mitosis and meiosis	Biology experiment (ES) Laboratory exercises for genetics (LS, US)
	Observation of protoplasmic streaming	Biology experiment (ES)
	Observation of microspore development	
	Observation of stomata	
Plant community	Examination of the community using a quadrat method	Biology experiment (ES)
Animals		
Ants	Classification and behaviour	Practice of ecology (US)
Wood louse (<i>Armadillidium vulgare</i>)	Seeing the tropotaxis	Biology experiment (ES)
Earthworms	Anatomy	Biology experiment (ES)
Plankton	Classification	Practice of ecology (US)
Benthos including Oligochaeta, Diptera.	Classification	
Fishes (<i>Rhodeus ocellatus</i> , <i>Carassius auratus</i> , <i>Pseudorasbora parva</i>)	Classification and behaviour	

* These subjects of study are provided for (1) the students belonging to the Division of Natural Science in elementary (ES), lower (LS) and upper secondary (US) school, (2) those belonging to that of Technology in lower secondary school (LT) and (3) those belonging to Night-time course for elementary school teacher training.

IV Discussion

In chapter II of the present paper, an outline of the current situation of the experimental farm of the teacher training universities are described. It is apparent that there are many problems in keeping the farm and in having the more positive use of it. So long as the universities are to be required to have a primary role in providing school teachers, meaning of having the farm should reflect both in education and research. Role and perspective of the farm have been



Fig. 2. Photographs showing some field practices carried out in the farm. A and B are planting and harvesting of rice plant, respectively. C and D are cutting and digging of sweet-potato, respectively. E is vegetation analysis with quardart sampling method. F and G show crossing and harvesting of crossed spikes of wheat. H is analysis of productive structure of Japanese pampas grass using a stratified clip method.

maintained (5a, b), and necessity of future programme of the farm has frequently proposed in the answers to our question. The following views seem to be realistic plans in near future. (1) The farm should be used not only for the subject of biology and crop science but for the place where student could learn "Nature education and/or Science education". Reorganization of the farm as the garden for nature study should be necessary. Thus, the garden could be a place for having a quality as naturalist. (2) The farm could be utilized to have actual working experiences. The experiences may involve physical working with touching the land and living things and this may lead to have sensitivity on the living things through their changes such as growth, action, and die. (3) The farm could have a role in supplying the teaching materials for the schools at the near district. Supply of the materials becomes more and more difficult these years. Keeping of the potential for this may accompany with some difficulties unless adequate system is established. One of the possible ways of the system seems to be the center for teaching material-supply.

On the other hand, we shall look at the individual material using for the education. Materials should be chosen according to the definite purpose of practice. But, providing every material for respective purpose should not be possible and economy. Choosing the materials which are adequate to use for plural purposes are important task.

Development of the multipurpose materials which are obtainable from the experimental farm will be required. Shigenobu has emphasized the use of bridal veil (*Gibasis geniculata*) as a multipurpose material which is easy to obtain and cultivate at anytime [6]. He introduced it for biological observations and experiments fitted in the school curriculum in Japan (six items for the elementary school level, nine for the lower secondary school level, sixteen for the upper secondary school level, and twenty for the university level.)

In this sense, wheat and onion are also the recommended material which can be useful at any school level (details for the wheat see 8,9 and that for beans see 7). Examples how to use them in university level are given in Table 4. Application of these materials and some other plants to each school level will be closely examined in the forthcoming paper.

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Notes and References

- [1] The Association of the Experimental Farms of Teacher Training Universities in Kinki District of Japan holds annual meeting and its record has been published as the *Report* irregularly (written in Japanese). In the 3rd issue of the *Report* (1983, ed. S. Ishii), the current situation of using the farm of each university was described by the following authors: (a) Katayama gave it for Shiga Univ., p. 1; (b) Horino, Y. it for the nursing school for weak children attached to Shiga Univ., p. 4; (c) Yanagawa, T., Tabuchi, S. and Ito, I for Kyoto Kyoiku Univ., p. 7; (d) Ishii, S. and Maekawa, K. for Nara Kyoiku Univ., p. 11; (e) Mukai, Y. for Osaka Kyoiku Univ., p. 15; and (f) Kamae, M. for Kobe Univ., p. 19.
- [2] Ishihara H. has made Table showing the current situation of the farm of the teacher training universities (in Japanese).

- [3] Mukai, Y., Kondo, T. and Kato, K. (1982) Utilization of the experimental farm attached to the teacher training universities (in Japanese). *Annual Proceeding from the Research of the Association of National Universities for Teacher-Training*, p. 33.
- [4] In "An Outline of Takawashi Experimental Farm of Osaka Kyoiku University (1981, ed. K. Kato), the following articles (in Japanese) are included : (a) Kondo, T. : Flora and fauna in the farm, p. 11; (b) Mukai, Y. : Takawashi experimental farm : A useful place for teaching and research, p. 22; (c) Mukai, Y. : Preservation of plant lines in the farm, p. 22.
- [5] In the 2nd issue of the *Report* (1980; ed. A. Konoshima) referred as [1], the following articles (in Japanese) are included : (a) Okamoto, Y. : Some thought on science education : A plan towards science education center, p. 1; (b) Ishii, S. and Nakata, K. : The prospect and role of the experimental farms of the teacher training university, p. 4.
- [6] Shigenobu, Y. (1980) Use of *Gibasis geniculata* as live teaching material. *Proceedings of the 8th Biennial Conference of the Asian Association of Biology Education*, p. 117.
- [7] Kato, K. and Handa, S. (1980) An attempt of getting comprehension on living organism. *Abstract of the 8th Biennial Conference of the Asian Association of Biology Education*.
- [8] Tanaka, S. and Mukai, Y. received a Grant-in-Aid for Scientific Research (part C, No. 56580219) for the subject, Development of new teaching materials for genetics in high school biology. Main part of this work was published as the report in 1983 (in Japanese).
- [9] Tanaka, S. and Mukai, Y. have presented an article, Wheat: A useful organism for teaching plant genetics in the 6th International Wheat Genetics Symposium at Kyoto in November of 1983. This will be published in the *Proceedings of the Symposium*.

教育系大学における農場の現状と生物教材の開発 (向井康比己・加藤憲一・近藤高貴)

表題に関した若干の事項について国立教育系大学・学部 of 農場等に問い合わせたところ、24大学から回答が寄せられた。その結果に基づき、農場使用の現状について、利用している課程・専攻・科目および科目内の実習項目等の観点から、若干のまとめをしてみた。利用内容は多様で、将来における利用希望も多いにもかかわらず、利用している課程や専攻の数・回数が少ない大学が相当見られた。このことは、利用形態や運営機構を含め改善の必要を示すものと言える。次に、本学農場での使用実態についてやや詳しく述べるとともに、各授業での実習における使用生物材料等についても調べた。各課程・専攻ごとに、少数の材料の多目的利用の開発の問題について具体的に論じた。