

## COMPRASION OF DIFFERENT MATURITY PERIOD TO INCREASING YIELD AND QUALITY OF SOYABEAN

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### ABSTRACT

*Crop physiology is one of the important subjects to understand biological processes and functions. Through the science of crop physiology, it is possible to understand crop growth and development, components of plant yield, and their interactions. The Yukihome is early flowering variety and takes about 35 days, Tachinagaha variety is medium flowering and takes 40 days, and Fukuyutaka variety is late flowering and takes 56 days from sowing respectively.*

*Yukihome variety is highest by 100 seed weight for soybean and its weight was measured as 34.2g. Tachinagaha variety is highest by total yield and harvested 1.62 t/ha.*

**KEY WORDS:** node, stem, pod, branch, sample yield

### INTRODUCTION

Soybean (*Glycine max L Merrill*) is one of the oldest cultivated crops. It is a native of Southeastern Asia and has been cultivated in Japan, India and China, Korea since ancient times. They were introduced to Korea 2500 years ago and from there to Japan 2000 years ago. Soybeans are cultivated in more than 50 countries and regions. In China and Japan, it is the second most important crop next to rice as a food crop. Besides being an important source of vegetable oil and protein meal the immature bean and pod of soybean can be eaten as a green vegetable, hence called as green soybean.

Also dried soybean is consumed whole, split, sprouted or in various processed forms like tofu, soy sauce, paste and others.

### METHODS

The necessary data was taken from 16 plants of each variety for the measurement of growth and yield parameters like plant height, number of leaves per plant, number of node, number of

The consumption of soya is very small due to the small productivity. Soybean is cultivated in relatively smaller area. This is due to the fact that in Mongolia, there are mainly two regions with conditions somehow suitable for the cultivation of soya. It is very important to consider the maturity date of the crop amongst other issues. It is therefore important if soya production is to be increased in Mongolia, to address the following problems;

- Develop high yielding, disease resistant and early maturing varieties.
- Improve on seed production and quality
- Introduce improved production technologies.

branch, weight of plants without leaves, number of pods per plant, total seed weight per plant, marketable seed weight and its percentage and 100 seed weight. In addition, the number of days from

sowing to flowering and from sowing to harvesting for every variety were also observed and recorded and all the results are presented in the results and discussions. All the data gathered

were computed statistically using the Analysis of Variance and F-Test and the result were interpreted at both 5% and 1% levels of significance.

## RESULT AND DISCUSSIONS

Crop physiology is one of the important subjects to understand biological processes and functions. Through the science of crop physiology, it is

possible to understand crop growth and development, components of plant yield, and their interactions.

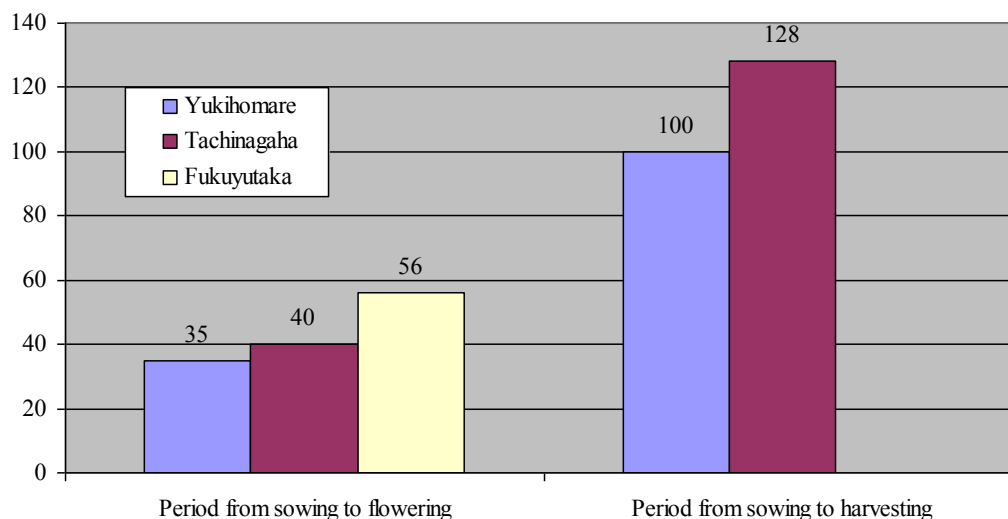


Fig 2. The comparison of different maturity varieties and sowing to harvesting time

### *Period from sowing to harvesting:*

Fukuyutaka variety is still growing not yet harvested. Yukihomeare variety gave good full mature yield and 100 days after harvested, its 128 days from sowing to harvest in the Tachinagaha variety.

Table 1

The effect for different varieties measuring fresh sample of 8<sup>th</sup>, September

№	Varieties	Plant height (cm)	Number of node	Number of branch	Number of leaves	Number of pod	Plant weight (g)
1	Yukihomeare	32.8	7.7	1.4	36.8	34.1	85.5
2	Tachinagaha	37.5	10.5	6.6	128	81	206.9
3	Fukuyutaka	59.1	13.1	5.6	148.6	44.4	280.7

As shown in Table 3, it was second measurement fresh matter of soybean was conducted on 8<sup>th</sup>, September. As a result, it is measured plant height, number of node, number of branch, number of leaves, number of pod of soybean. For example, among the soybean varieties the highest (6.6) Tachinagaha variety, the lowest (1.4) Yukihomeare variety by number of branch were observed. But Fukuyutaka variety was measured the highest by mean plant height (59.1cm), number of node (13.1), number of leaves (148.6) respectively. Yukihomeare variety the lowest (34.1), Tachinagaha variety the highest (81) by number of

pod setting of soybean were found. Fukuyutaka variety was middle part. Because this variety not enough vegetate.

As shown in Figure 4, the late maturity Fukuyutaka variety has given a severe biomass for dry weight of stem (136.2), number of leaves (106.9). It's useful to increasing severe produce biomass, photosynthesis process of Fukuyutaka variety. We were thinking the growing stage of soybean varieties has a different influence. However this variety gave lowest setting dry weight of pod (21.1), Yukihomeare variety gave good highest opposite logic for dry weight of pod

(62.5). The comparison of vegetate component and dried matter. Therefore early maturing Yukihomeare variety has a smaller leaf, long stem

and long days. Then late, middle maturity varieties have a large leaf, more plant weight and high plant components.

Table 2

The effect for different varieties on the growth component of soybean						
№	Varieties	Stem length, cm	Number of branch	Number of node		Number of pod per plant
				Stem	Branch	
1	Yukihomeare	31.5	2.4	8.5	7.6	27.4
2	Tachinagaha	50.5	5.2	12.8	25.6	59.8
3	Fukuyutaka	83.9	4.8	15.9	32	105.2

We had a different harvesting time, for Yukihomeare variety on 23<sup>th</sup>, October, Tachinagaha variety on 21<sup>st</sup>, October were harvested. It was observed as different varieties did not mature at the same time, thus harvesting was done when the plants have shown signs of maturity like brownish color of pods and falling of matured leaves.

Harvesting was done by uprooting the whole plant, removing the soil that clings to the roots and was brought to the glass house. The plants were then dried for 5 days and varietal samples were measured. Height of soybean plants was significantly affected by different varieties. As shown in Table 4, the tallest plants were observed in the Fukuyutaka variety as 83.9 cm in height, but the shortest plant was found in Yukihomeare variety as 31.5 cm in height. By means of different varieties, very high difference was observed. It means a stem length grows as long as much that follows the increasing long days. Soybean varieties are different by number of

branch, and approximately 2.4-5.2 branches per plant were counted.

In case of branch height by variety, the highest was Tachinagaha variety 5.2 cm and the lowest Yukihomeare variety 2.4 cm in height were measured. Therefore compared Tachinagaha variety and Fukuyutaka variety little bit approximate 4.8 cm of number of branch. We got a measurement on two divided stem and branch of number per node. Number of node stem is increasing from early maturity (8.5) to late maturity (32). Late maturing- Fukuyutaka variety influences more on stem length and increasing number of node. Different maturity has significantly effected on the number of pods produced by each variety. More number of pods was harvested (105.2) on the Fukuyutaka variety while the Yukihomeare variety gave less number of pods per plant (27.4). Although it's was matured a pod this area early and middle maturity varieties.

Table 3

The effect for different varieties on the yield component of soybean						
№	Varieties	Seed ratio		Weight of 100 seed	Sample yield (g)	Total yield t/ha
		Fine seed (%)	Damaged seed by insects (%)			
1	Yukihomeare	55.4	45.5	34.2	533.7	0.86
2	Tachinagaha	75.1	24.9	31.3	890.2	1.62

In soybean is very important characteristic in seed ratio. As a shown in Table 5, the harvesting of Soybean varieties were done at the maturity like brownish color of pods and falling of matured leaves. Yukihomeare variety has a very short mature stage, it has ripened by 4<sup>th</sup>, September. I was thinking that in short growing period, varieties may be easily attacked by insect the pod and seed. However we have sprayed 2 times the pesticide to all varieties. According to seed ratio after harvesting measurement, Yukihomeare variety has demonstrated highest yield by fine seed quality

(55.4) and shown less amount of insect damaged seed (45.5) comparing to other variety.

Seed ratio in middle maturity variety has determined 75.1% as fine seed and 24.9% as insect damaged seed in total amount of yield. Analyzing from this result, long days varieties has a less chance to be attacked by insects, thus its seed has damaged less.

As a shown in Table 5, by weight per 100 seeds of soybean varieties are different; it has recorded as 31.3-34.2 g per 100 seed weight. Tachinagaha variety was measured 31.4 g as moderate,

Yukihomare variety 34.2g as highest by 100 seed weight among the soybean varieties.

In my hypothesis, Tachinagaha variety is highest by 100 seed weight. As a shown in figure 5, mean weight of early maturity Yukihomare variety 34.2g, Tachinagaha variety 31.4g have shown respectively. As seen the results, however the Tachinagaha variety is lower than other varieties, but it depends on the maturity of varieties.

Before harvesting, the total size of one plot was 12m<sup>2</sup>. It has been sampled inside plot by 7.2 m<sup>2</sup> insize. Soybean varieties gave a different yield

as 533.7-890.2g/7.2m<sup>2</sup> by sample yield. In comparison of soybean varieties are the lowest was Yukihomare variety by 533.7g, and Tachinagaha variety was highest by 890.2g yield. Also showing into Figure 6, we have compared the early and middle maturity varieties to calculate by transferring to ton per hectare, that Tachinagaha variety 1.62 t/ha has harvested in total yield. Because the early maturity variety is moderate in stem length, number of pod and its short growing period depends on yield component. Fukuyutaka variety is still growing in the open field.

### CONCLUSION:

1. The Yukihomare variety is early flowering and takes about 35 days from sowing, Tachinagaha variety is medium flowering and takes 40 days from sowing, and Fukuyutaka variety is late flowering and takes 56 days from sowing.
2. Yukihomare variety was taken 100 days from sowing to harvesting as shortest, Tachinagaha variety was taken 128 days as latest are considered.
3. Fresh matter Fukuyutaka variety was observed the highest by plant height 59.1cm, number of leaves 148.6g and plant weight of soybean.
4. Late maturity Fukuyutaka variety gave a severe biomass for dry weight of stem (136.2), number of leaves (106.9).
5. Yukihomare variety is highest 34.2g by 100 seed weight in soybean.
6. Tachinagaha variety is highest in total yield 1.62t/ha of soybean.

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