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Flowering induction and formation of salak (*Salacca sumaterana* Becc) fruit with potassium and boron fertilization

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Abstract. Salak Sidimpuan is one of the superior commodities of Padang Sidimpuan that taste sweet, sour and make it different from Pondoh and Bali. Physiological conditions will greatly affect the growth and development plant especially the phase of flowering and fruit formation. Other factors that affect the flowering phase and fruit formation are nutritional status and relative water content in the plant. The purposes of study to get the best concentration of Potassium and Boron on fruit formation and Sidimpuan zalacca production off season. This research was conducted at Palopat Maria village, Padang Sidimpuan City. This study was conducted from July 2017 to March 2018. The experiment was conducted Split Plot Design with three replications. The main factor is the potassium fertilizer i.e. without potassium, 20 g and 40 g / tree potassium. The subplot is the B fertilizer dosage i.e. without fertilizer B, 1000, 2000, 3000 and 4000 ppm /tree. The results showed that Sidimpuan Salak Plant was a hermaphrodite flowering plant, carried out its own pollination and the time it took from flower up fruit ready to harvest about 5.5 to 6 months. The highest number of fruit Bunches (8.74 bunches) was obtained at 20 g / plant while in B 3000 ppm / tree was 9:01 bunches.

1. Introduction

Salak is one type of tropical fruit native to Indonesia become one of the leading commodity and plants suitable to be developed. The regions in Indonesia recorded as salak production centers are: Mulberry (North Sumatera), Serang (Banten), Magelang (Central Java), Sleman (Yogyakarta), Karangasem (Bali) and Enrekang (South Sulawesi). But in general, regions that are producing fruits salak typical. One type of tropical fruits are well known on the island of Sumatera and even in Java is Salak Sidimpuan (*Salacca Sumaterana* Becc.).

Sidimpuan Salak is one commodity Padang Sidimpuan seeded fruit that tastes sweet, chelate, sour and sweet makes it different from Pondoh salaking, salaking Bali and other types. Salak plant Sidimpuan scattered throughout the districts in Tapanuli South Side as well as production centers salak Sidimpuan more precisely which is in District Angkola West, East and Angkola Angkola South.

Based on crop production aspects of Sidimpuan salak are potential to be developed in South Tapanuli, because the area has reached approximately 19 155 ha with a production potential of up to 30 tons / ha [1]. But from interviews with farmers salak Sidimpuan, the production of salak that is obtained continuously decreased to maximum only reach 10 tons / ha per year. The application of good farming technology and the right course is a key requirement in order to achieve the target in order to increase the production of Salak Sidimpuan.

In anticipation of the expansion of imported fruit products so that the loss of the local fruit production in the country it is necessary to conduct quality improvement through site-specific farming

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technology transfer and environmental engineering is done as early as possible. Enterprises manipulation of plant physiological and environmental engineering to grow as a factor limiting plant growth including salak is one of the solutions so that the plants can bear fruit in the off-season is certainly very necessary, so that the fruit produced good quantity, quality and continuity can be met according to market demand [2].

Naturally plants in general as Sidimpuan Salak is included in the family palmae other examples such as palm oil, flowering once every 3 months or 4 times a year, in January, April, July and October. Currently 4th of the flowering season, harvest or production can be done only twice a year i.e. in the harvest season (January to February) that the fruit develops from October and harvest the flowering season gadu (July-August) of the flowering of April. But the continuity of the process of flowering and fruit formation in plants Sidimpuan Salak is strongly influenced by internal factors such as nutrients and growth regulators and external such as climate, rainfall and growing environment.

When studied further, another factor as the cause of the decline in the number of production plants are salaking Sidimpuan climatic conditions increasingly uncertain as the increasingly long dry season while the rainy season and low rainfall. This condition will greatly affect the physiology of plant growth and development, especially flowering phase Sidimpuan salak and fruit formations. Besides, other factors also affect the phase of flowering and fruit formation include internal factors such as nutritional status and relative water content in the Body of plants and others.

The fact is the case today in Sidimpuan salak plants and other kinds of salak, which is more commonly harvested only once a year i.e. during the harvest only. While the other three seasons of flowering the flowers fail to grow produce fruit or fruit-set is called the flop. Some flowers there that manages to be fruit, but the percentage is very small so that the fruit is harvested only a few [3].

The problem faced by the farmers due to the off-season flowering process often fails growing fruit or flowers become fruit-set failure. [2] stated that several unsuccessful development of flower into fruit caused by unfavourable environmental factors, such as rainfall and rainy days are low, and low soil nutrient content so that the plant nutrient indicated by the content of N, P and K leaf low

Then one of the solutions offered in the form of production technology applications outside the harvest season (off season), which aims to plant salak that can produce fruit out of season as it can bear fruit harvest during the harvest season (on season). Through technology applications in the off-season production on plant fruit trees like Sidimpuan Salak expected that the condition of external and internal factors that affect the process of flower and fruit are in optimum condition as at the time of fruiting (on season). So expect flowering and fruit formation process especially in plants Padang Sidimpuan will last well and can be harvested throughout the year.

One way that can be done to overcome the above problems is to add fertilizer. Fertilization is attempted administration or the addition of nutrients in the amount and manner as required crop into the ground in a certain time. Fertilization K and B will increase the growth and yield of Salak Sidimpuan.

Nurrochman et al [4] reported that the application of fertilizers potassium chloride (KCl) of 10 grams / plants, 20 grams / plant, and 30 grams / plant and fruit thinning. Weight of fruits in bunches highest achieved at a dose of 20 grams / KCl plants without fruit thinning.

Fertilization micro nutrients such as Boron is usually given through a leaf or reconstituted before being given to the plant roots. In this study, Boron is given in the form of solutions provided in the plant root salak. The dissolved Boron will be easily absorbed by the plant.

Ali et al [5] explained that the provision of Boron in plants can help in the formation of proteins, as well as other micro nutrients, Boron fertilizer can be administered by spraying the leaves, fertigation, seed treatment and soil fertilization.

Further Boron regulates the activity of ascorbic and dehydroascorbic roommates losses Tus cell wall and giving more space to grow and increase of the elongation and meristematic regions in rings [6] Boron Reviews those micronutrients is one of the which are rapidly becoming deficient in soils [7] Boron plays important role in physiological processes like carbohydrates metabolism, translocation and development of cell wall and translocation of sugar and carbohydrates [8]. The micronutrients act as a catalyst and enhance the chemical composition of fruits and are also vital for the physiological activities within the plant [9]

Analysis of the leaves has been used as a guide in diagnosing the problem as a basic nutrient and fertilizer recommendations fruit crops fruit crops - fruits including salak. Besides network analysis can determine nutrient deficiencies in plants as early as possible. Therefore do Sidempuan salak leaf tissue analysis and its relation to the formation of flowers and fruits salak.

This study aims to get a dose of potassium and Boron concentrations on the formation of fruit (fruit set) and production plants in the off-season Sidimpuan salaked so salak Sidimpuan plants can fruit throughout the year. The benefits of this research are expected to provide knowledge and overcoming failure fruit formation (fruit set) and the application of technology in the production of season of the application of Potassium and Boron fertilization so it is expected the plant will be able to salak Sidimpuan fruit throughout the year.

2. Material and Methods

This research has been carried out in the garden salaking Sidimpuan located in the village Palopat Maria, Village Hutaimbaru, district of Padang Padang Sidimpuan Hutaimbaru Sidimpuan. 400 land elevation above sea level with the soil pH around 5.5 - 6.0. This study was conducted starting in July 2017 until March 2018.

The materials used in this study include Padang Sidimpuan salak plants which have both male flowers bloom and hermaphrodite flowers, fertilizers chloride potassium and sodium tetra Berate. The tools needed such as hoes, machetes, shovels, measuring instruments, scales, all the equipment in the manufacture of drip irrigation installation is simple, stationery, cameras and other equipment related to the implementation of this research.

The research was conducted with an experimental method in Design Divided plot, consisting of three replications. The main factor is the provision of potash fertilizer consists of: 0, 20 and 40 g. Subplot factor is the concentration of fertilizer B consisting of 0, 1000, 2000.3000 and 4000 ppm / plant. The study consisted of 15 combined treatment with 3 replications thus obtained 45 populations of plants and at all plant as sample plants.

Fertilization takes place in August, 2016 and the month November 2017 by way of immersing into the ground as deep as 10 cm in a circle with a distance of 50-60 cm from the base of the stem.

Provision of water with a simple irrigation systems that water movement carried out by gravity. The device includes an emitter type drip irrigation line source emitters with a number of holes by 28 holes per line, the main pipe, filter, water reservoir with a capacity of 650 l, and the pump. Water reservoir installed at a height of 2.5 m. The water coming out of the water Body, then flowed through the main pipe to the line source emitters. Each plant installed one line source emitters. During the study provision of water with drip irrigation systems have performed a total of 280.33 liters / season / crop or 1.5 liters / day / plant.

Phase of the research that has been done is as follows begins with determining the salak samples of healthy plants and still productive. Total population as well as the number of plant samples and labeling each plant sample. Subsequently clean the soil around the root zone of plants salaking before application of K and B at a dose and time of application according to treatment research. Watering do with the volume of 1.5 litre per plant. Fruits harvest activities carried out on samples of plants that are ready to harvest.

Parameters of observation in this study is descriptive throughout the development phase of the formation of flowers and fruits hermaphrodites, hermaphrodite flowers Bunches number, percentage of fruit formation (fruit-set) the number of bunches, the number of bunches of fruit number and fruit sugar content. Environmental factors grew consisting of: Soil analysis: elements of N, P, K (analysis carried out in the Laboratory of Soil Department, Faculty of Agriculture, University of Andalas. The Form N total with methods Kjedahl, P-available methods Olsen and Bray and K-total with methods HCl 25 %.)

Data obtained from this study were analysed by ANOVA. If the F test shows the difference in treatment was significantly different, it will proceed with HSD test 5 %.

3. Results and Discussion

Flower and fruit formation Padang Salak Sidimpuan observed by shooting in the form of photos, so it can be parsed descriptively. Observations results portray the development of flower morphology to form

fruits. The following shows the observation development plant flowering and fruit formation Sidimpuan descriptive salak (Figures 1a and 1b).

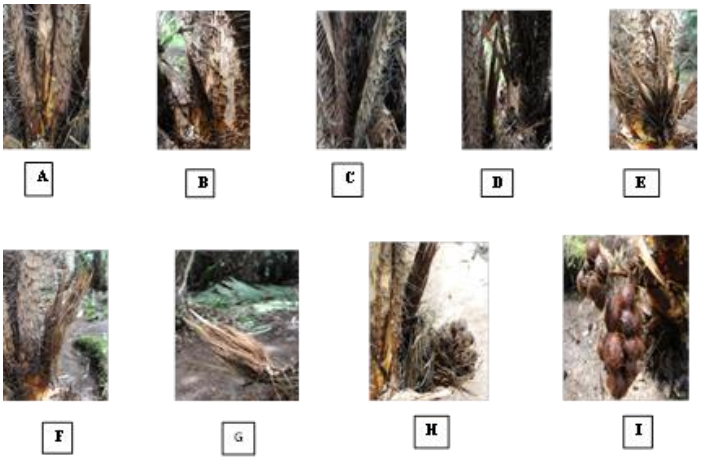

Figure 1a.

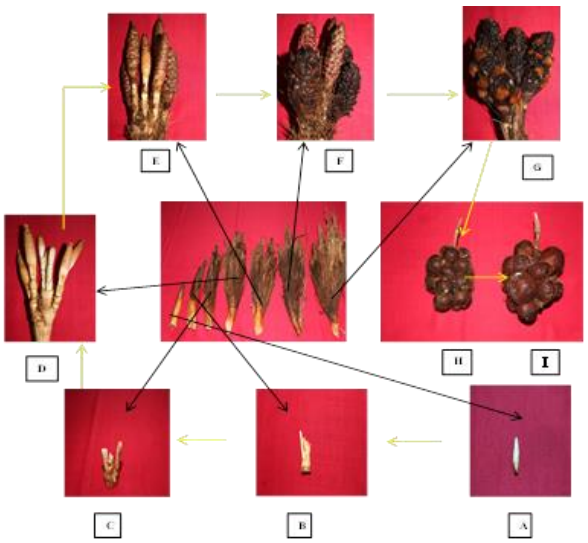

Figure 1b.

Figures 1a and 1b. The development phase of flowers and Sidimpuan Salak fruit while still in plants and closed sheath and after Learned from plant and without sheath.

Note:
A = Flowers aged ± 1.0-1.5 months
B = Flowers aged ± 1.5-2.0 months
C = Flowers aged ± 2.0-2.5 months
D = Flowers aged ± 2.5-3.0 months
E = Flowers aged ± 3.0-3.5 months
F = Flowers and Fruits aged ± 3.5-4.0 months
G = Fruits aged ± 4.0-4.5 months
H = ± 4.5-5.0 months aged Fruits
I = ± 5.0-6.0 month aged Fruits

Bunches of flowers of new Sidimpuan Salak will appear at the base of the leaf midrib every 1.0-1.5 months. Flowering phase lasts for 3-3.5 months (Figure 1b. AE) after which it will enter the phase

of fruit formation. Phase formation of fruits until the formation of fruits ready for harvest lasts from age 3.5-4.0 months to 5.5 months - 6.0 months (Figure 1b, FI).

Salak plant has small flowers appear in the armpits midrib, blooms for 1-3 days. When I was younger shrouded Bat-shaped sheath. Symmetry radial, trifoliate petals and three petals. Florets flowers can be divided into large and small, both are united in one basic interest had one ovary with one ovule. Male flowers, consisting of stamens without a pistil. Flower buds have crown and small flowers that meeting, the group consists of 4-14 panicles. One panicle consists of thousands of pollen. The length of the entire interest of about 15-35 cm, while the length of panicle 7-15 cm. Produce only female flowers pistil, slightly rounded shape. Have crowns and buds with a single pistil and ovules arranged in bud. One calyx consists of 1-3 panicles, each containing 10-20 panicles ovaries. The length of 20-30 cm whole flower, panicle length 7-10 cm. Yellowish-green color and red and prior to full bloom flowers are colored black. In addition to male flowers and female flowers there is also interest hermaphrodite [10]

At the plant salak that only male or female flowering, the plants need cross-pollination, pollination is done with the help of the wind, or human and insect. Natural pollination by wind is lower than pollination by insects and human assistance because stamens in the flower is attached salak. According to Julita et al [11], Boron role for plants in supporting the process of metabolism and transport of sugar, melismatic network, the formation of cell walls, lignification, membrane integrity, DNA synthesis, elongation of roots, the formation of pollen and pollination. Boron also functions in the synthesis and transport of carbohydrates, growth, and development of pollen, as well as the activity of the cells [12]

Kelly et al [13] stated that the quality of pollen can be determined from the level of viability. Fertilization may not occur without the presence of a high pollen viability. With high pollen viability will first fertilize an egg, so that the fertilized egg first early will develop into an embryo from the fertilized egg then. Formed early embryos have a better chance to utilize photosynthates for growth and development in seed formation and thus the embryo can develop into seeds that have a high viability [14]

3.1. The percentage of fruit formation

Data Percentage Salak fruit formation Sidempuan presented at the flowering period August - November 2017 and December 2017 - March 2018 is presented in Figure 2. The formation of fruits showed different results from application of Potassium. In Figure 2 it can be seen that the highest percentage of fruit formation by add 20 g /plant K 58 269% and the lowest without the addition of K is 41 109%. During the flowering period of August - November 2017. At the highest flowering of December - March the highest fruit set is also at 20 g K, which is 52.55% and the lowest is without the provision of K, which is 41.338%. From Figure 2 it is clear that K administration can increase the percentage of *Sidimpuan zalacca* fruit formation. This is in accordance with the role of K which can increase flower formation and fruit

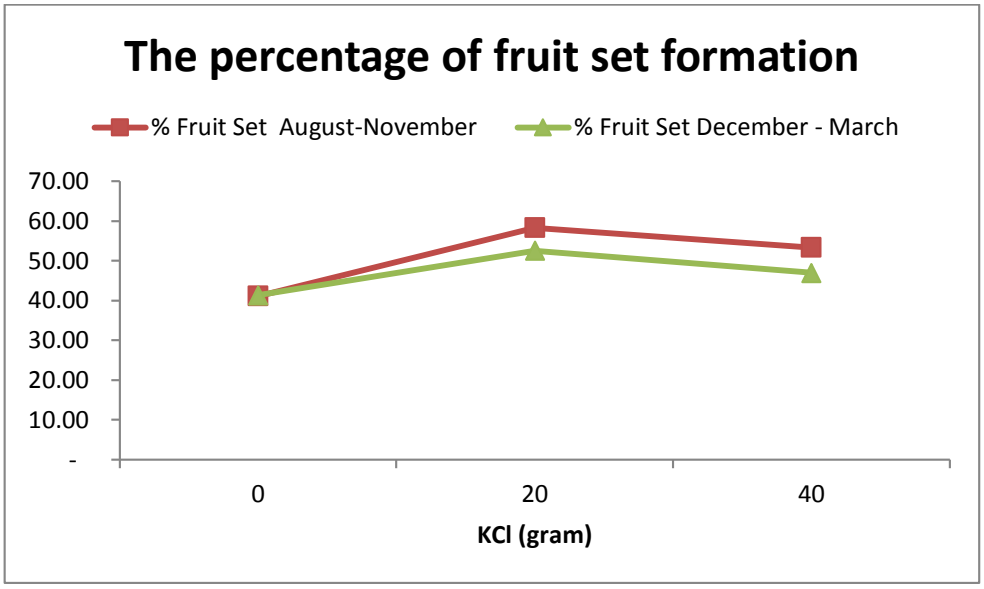

Figure 2. Percentage fruit formation by the addition potassium.

From Figure 2 clearly visible that an increasing percentage of formation of fruits with potassium addition of 0-40 g / plant. The highest percentage of fruit formation occur with potassium 20 g / plant and the addition of potassium 40 g / plant tends to decrease. This is related to the role of potassium can increase the percentage of fruit formation. [15] Stated that potassium fertilization can improve the physiological characteristics that result in increased production. Administration of potassium in potatoes not only increase yield but also improves the quality of tubers [16]. Vidyalaya [17] concluded the application of 100% NPK + 0.1%Zinc enhanced the early floral bud initiation and early panicle emergence.

While the Boron fertilization treatment, the highest percentage of fruit formation in flowering from August to November 3000 ppm obtained in B is 59. 657% and the lowest percentage of fruit formation obtained in the treatment of 1000 ppm B is 43. 434%. Likewise, during the flowering months of December 2017 - March 2018 on Boron fertilization treatment, the highest percentage of fruit formation was obtained in the treatment of B i.e. 3000 ppm 52. 886% and the lowest percentage of fruit formation obtained in the treatment of 1000 ppm B is 42. 698%. Fruit formation percentage by administering Boron is showed in Figure 3.

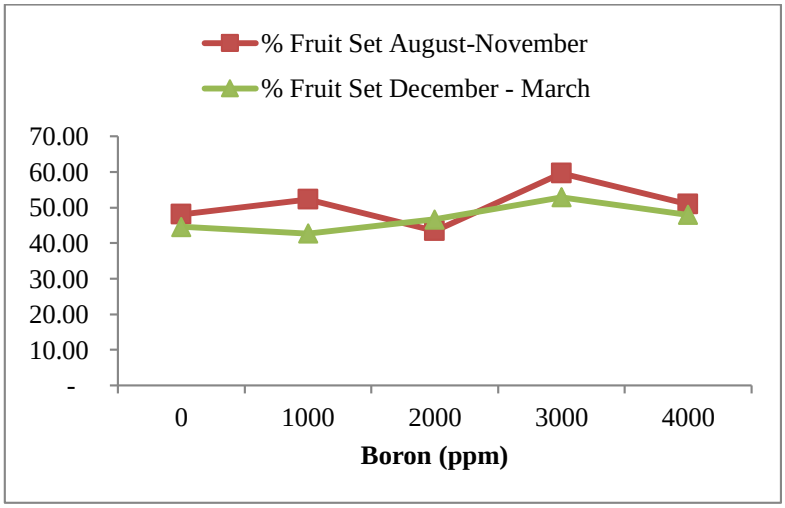

Figure 3. Percentage of formation of fruits set by addition Boron.

The percentage of fruit formation was positively correlated with zalacca production, namely the higher the percentage of fruit formation, the higher the yield of fruit and the weight of fruit. In Figure 3 it can be seen that the increase in the addition of boron to 4000 ppm decreases the percentage of fruit. This may be a high concentration of B has begun to inhibit the formation of zalacca fruit.

3.2. Total Fruit Bunches

The data were bunches of fruits Sidempuan amount presented in Table 2. At flowering from August to November 2017 there were no differences between administration without giving K and K 20-40 g / plant. While on flowering in December 2017 - 2018 Maert there are differences in the number of bunches of fruits highest in the administration of 20 g K real different with no provision granting K K and 40 g / plant. This is consistent with the results of the study [3] applying fertilizer potassium chloride (KCl) of 10 grams / plants, 20 grams / plant, and 30 grams / plant and thinning buh. Weight of fruits in bunches highest achieved at a dose of 20 grams / KCl plants without fruit thinning.

At the time of flowering in December 2017 - March 2018 the average number of bunches highest yield was obtained in treatment 20 g K is 4.47 bunches and the average number of bunches lowest harvest obtained in the treatment of 40 g K is 3:00 bunches. While the Boron fertilization treatment, the number of bunches highest yield obtained was almost the same (3.22 - 3.78) bunches.

In general, the average number of bunches harvested at flowering period August-November 2017 a higher than average number of bunches harvested at flowering time in December 2017 - March 2018. It may be associated with the condition of a drier climate in December 2017 - March 2018. Based on the results of the study [2] the percentage formation of fruit (fruit set) in crops of sugar lower salaking associated with internal water content of low crop plants caused by limitations in getting water because of rainfall and rainy days are low.

Table 1. Number Salak fruit bunches Harvest Moon Sidimpuan on Flowering period August to November 2017 Month December 2017 - March 2018.

Treatment	Fruit Bunches number Agt-November (Bunches)	Fruit Bunches Des - Mar (Bunches)
KCl (g)		
0	4.87	3.20a
20	4:27	4.47b
40	3.87	3.00a
Boron (ppm)		
0	4.89ab	3.78
1000	4.11ab	3:44
2000	5.22b	3.78
3000	3.11a	3:22
4000	4.33ab	3:56

The number of Sidimpuan Salak fruit bunches in flowering from August to November 2017 has a temporary difference between December 2017 - March 2018. The results are almost the same. The highest number of fruit bunches was obtained by giving 2000 ppm boron which was 5.22 fruits and the lowest was 3.11 fruits.

Phosphorus and potassium together with nitrogen increase nutrient uptake for phosphate which is produced by increasing leaf area. The third application of nutrients will increase leaf area. With increasing leaf area will increase photosynthesis, the number of fruit bunches produced will increase.

Also some micronutrients have been found to play roles in plant productivity. In olives, Boron appears to be particularly subject to important. Deficient B has been demonstrated to increase of the

percentage of imperfect flowers and to Decrease fruit set [18]. Availability of Boron in the soil is at 0.5 to 2.0 ppm but only 0.5 to 2.5% available for the plants [19].

Ali et al [5] explained that the provision of Boron in plants can help in the formation of proteins, as well as other micro nutrients, Boron fertilizer can be administered by spraying the leaves, fertigation, seed treatment and soil fertilization. Boron also affects fertilization by increasing the production capacity of pollen from the anthers and viability of pollen grains.

3.3. Fresh Fruit Weight

Data on the number of fruits Sidimpuan presented in Table 2. Fertilization affects the growth and yield of plants. Both the addition of potassium and boron fertilizer have an unreal effect on the weight of sidempuan salak fruit. Fruit weight in August - November flowering ranges from 3.90 - 4.06 kg. While in flowering December - March 4.26 - 4.94 kg. From Table 2 it is seen that the weight of fruit in December - March flowering is higher than August - November. This is related to climatic conditions where the climate is very influential on flowering and fertilization of zalacca. Nurrochman et al (2013) stated that KCl fertilizer application states that KCl fertilizer application on zalacca plants will affect the weight of zalacca fruit in bunches.

Table 2.The fresh weight of the fruit Salak Sidimpuan in the Flowering in August - November 2017 and December 2017 Month - March 2018.

Treatment	Fruit weights Agt- Nov (Bunches)	Weights Fruit Des - Mar (Bunches)
KCl (g)		
0	4.06	4.26
20	3.98	4.79
40	3.90	4.94
Boron (ppm)		
0	3.74	4.52
1000	4.08	4.65
2000	4.87	4.75
3000	3.17	5.47
4000	4.04	3.92

Application Boron also provides no real effect on the weight of good fruits flowering period from August to September and December to March. In granting Boron, flowering fruit weight from December to March is higher than the flowering August - November. At a concentration of 3000 ppm B increased weight of fruit in flowering from December to March is much higher than in August - November. This is related to climatic conditions / rainy day, where rainfall was higher in the months from December to March. The low weight of the fruit in flowering August - November lesser associated with lower rainfall for the month. In accordance with the results of the study Ray et al [2], the percentage of fruit set in low sugar salak plants associated with low internal water content due to the limitations of plants in obtaining water due to bulk and low rainy days.

There may be favourable effects of Boron on root development, formation of carbohydrates, regulation of water and translocation of photosynthesis to bulbs from leaves [20] with the development of the roots of the absorption will be better so translocase photosynthesis fruit to smooth it will increase the amount of fruit.

3.4. Sugar Content

Soluble sugar content of fruits of Sidempuan Salak at the end of the study are presented in Table 3. Fertilizer KCl does not affect the sugar content of fruits sifdempuan dissolved. Soluble sugar content ranged from 17.93 - 20:08 brix.

Table 3. Dissolved sugar content of fruit Sidimpuan Salak

Treatment	Soluble sugar content (Brix)
KCl (g)	
0	17.93
20	20.08
40	18.08
Boron (ppm)	
0	17.51 a
1000	16.58 b
2000	18.94 bc
3000	20.28 c
4000	20.17 c

Based on Table 3, it can be obtained that KCl fertilization treatment did not significantly affect the content of soluble sugar content in fruits Sidimpuan. However, based on the average number of the highest soluble sugar content obtained in the addition of 20 g K at 18.08 and the average content of soluble sugars obtained on an unannounced Lowest K is 17 927. From Table 3 clearly seen that the administration of K 20 g / plant has been able to increase the sugar content of fruits Sidempuan, but an increase in the provision of K to 40 g / plant sugar content lower than 20 g / plant.

At Boron fertilization treatment are a real influence on the content of soluble sugars of fruits Sidimpuan. The treatment resulted in an average of the highest soluble sugar content obtained in the treatment of 3000 ppm B, though not significantly different from the treatment of 4000 ppm. While the average content of soluble sugars obtained in the treatment room that is 16 578 1000 ppm. With a higher sugar content salaked certainly taste sweeter and less astringent so it will be much preferred by consumers, because consumers like the taste of sweet. Aref [21] reported that Boron also affects fertilization by increasing the production capacity of pollen from the anthers and viability of pollen grains. Boron indirectly plays a role in the pollination of flowers by increasing the concentration of sugar in nectar plants.

3.5. Content of Nitrogen, Phosphorus and Potassium leaves Salak Sidimpuan

In Table 4, average the highest leaf nitrogen content obtained at 20 g K + 3000 ppm B treatment is 2,064 and the lowest on without K and 4000 ppm B treatment is 0.982. The average content of phosphorus highest leaf 40 g K + 0 ppm B treatment is obtained at the lowest 0.563dan 20 g K without B treatment is 0.301. While the average high potassium content obtained at 20 g K + 1000 ppm B treatment is 1,634 and the lowest in 0753, namely without K + 1000 ppm B treatment.

These results indicate that the total potassium levels in the leaves of plants Sidimpuan salak medium (enough). This is consistent with the results of the study [22] that the nutrient potassium levels in leaf tissue from plant oil palm <0.75% moderate, and the range of 0.90 to 1.20% is enough.

Potassium is a nutrient that is essential for all living Body, in higher plant tissue, from 1.7 to 2.7% potassium regulate normal leaf dry matter (12) Availability of Boron in the soil is at 0.5 to 2.0 ppm but only 0.5 to 2.5% available for the plants [19].

Phosphorus and potassium along with nitrogen resulted in a maximum increase in nutrient uptake due to increased photosynthesis, resulting in an increased leaf area (23). Therefore a broad leaf, of course, has a higher nutritional content so that it will affect the formation of fruit and its weight. In an effort to improve Sidimpuan Salak production must be fertilized to ensure the availability of nitrogen,

phosphorus and potassium nutrients in plants for supporting the growth, development and production of salak Sidimpuan plant. (24).

Table 4. The content of Nitrogen, phosphorus, and potassium of leaves of Salak Sidimpuan

Treatment of K and B (g -ppm)	Nitrogen	Phosphorus	Potassium
0-0	1,739	0413	1,309
0-1000	2,027	0422	0753
0-2000	1,752	0488	1,074
0-3000	1,691	0366	0978
0-4000	1,247	0310	1,309
20-0	1,879	0301	1,392
20-1000	1,988	0459	1,634
20-2000	1,749	0544	1,151
20-3000	1,648	0376	1,226
20-4000	.982	0413	0842
40-0	1.735	0563	0775
40-1000	1,897	0404	0911
40-2000	1,786	0376	0884
40-3000	2.064	0384	0769
40-4000	1.775	0357	0778

3.6. Content of Nitrogen, Phosphorus and Potassium

After giving fertilizer to Sidimpuan zalacca plants twice, the nutrient content of N, P, K and Boron was analyzed. Data on N, P, K nutrient content and B salak leaves are presented in Table 5.

Table 5. Nitrogen, phosphorus, and potassium content of Salak Sidimpuan leaves after fertilization 1 and 2.

Type	Fertilization	
Nutrient	1	2
Nitrogen (ppm)	1.730	2.319
Phosphorus (ppm)	0.409	0.367
Potassium (ppm)	0.807	0.803
Boron (ppm)	0.399	1.119

After the application of fertilizer 1 and 2 (Table 5), the average content of nitrogen and Boron leaf salak increased each is from 1,730 ppm to 2,319 ppm and from 0.399 ppm to 1.119 ppm. While the leaf phosphorus content decreased from 0.409 ppm to 0367 ppm. The leaf potassium content tends to be the same, namely 0.807 ppm to 0.803 ppm. Potassium nutrients in the soil apart easily leached, its availability level is strongly influenced by pH and base saturation. At low pH and low base saturation easily lost potassium leached, at neutral pH and base saturation is high in potassium Bund by Ca. Cation exchange capacity greater increase soil's ability to hold K, thereby slowly releasing the soil solution K and reduce the potential for leaching.

While the treatment effect of fertilizers Potassium chloride (KCl) to the production parameters visible indication in treatment 40 g K. that the effect of Boron fertilizer on parameters of observation percentage of fruit formation, the number of harvested fruit bunches, weight and levels of dissolved sugar production is based on the average value is no indication that the treatment gives the best effect is treatment of 1000 ppm B and 2000 ppm B. The treatment effect of fertilizers Potassium chloride (KCl) to the production parameters visible indication in treatment 20 g K.

Table 5 shows that the increase in the Boron content of salak leaves to 3 times after fertilization 1. The effect of addition of boron fertilizer after two fertilization applications showed the highest average increase in salak leaves compared to the nutrient content of leaves other than boron such as nitrogen , phosphorus and potassium.

4. Conclusion

Based on the research that has been done can be concluded that Sidimpuan Salak plants are plants that have hermaphrodite flowers, undergo self-pollination and the time required since the emerging interest until the fruit is ready to harvest formed approximately 5.5 to 6 months. The highest percentage of fruit formation in KCl fertilization treatment during the flowering period August 2017 -November flowering Des 2017-March 2018 K obtained in treatment with a dose of 20 grams per plant and 3000 ppm B planting. The highest number of harvested fruit bunches K1 obtained in treatment at the time of flowering in December 2017- March 2018 as 4:47 bunches. The highest soluble sugar content obtained in the treatment of K 20 grams per plant and the treatment B 3000 ppm / plant. Boron content of the leaves increased from the time of fertilization to - 1 through fertilization to-2, while the average content of potassium leaves is relatively fixed.

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