International Research Journal of Engineering, IT & Scientific Research
Available online at https://sloap.org/journals/index.php/irjeis/
Vol. 3 No. 6, November 2017, pages: 21~30
ISSN: 2454-2261
https://sloap.org/journals/index.php/irjeis/article/view/7

The Period of Leaf Level and the Conflict in Efforts to Get the Ordinary Siam Plant

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Article history:

Received: 18 February 2017
Accepted: 18 September 2017
Published: 30 November 2017

Keywords:

flowering period;
fruit harvest;
orange siam;
period replacement;
physiology;

Abstract

The critical point of the formation of the fruit is largely determined by the flowering formation process. The study was conducted from March to November 2017, in Seming Village, Kerta District, Gianyar Regency of Bali Province. The research is descriptive so there is no special treatment given to the samples. The research is done by the descriptive method that is continuous research so that there is a thorough knowledge about the horticultural cultivation problem of tropical fruit, especially the citrus fruit so that the physiology science of flowering and flowering is obtained in relation get the fruit of the harvest. The citrus varieties used in this research are Siamese orange varieties that have been 6 years old. The number of samples observed as many as 10 plants with the observation of the shoot formation period with the observation once every two days, the percentage of leaf buds, the period of leaf buds, the number of buds that developed. The results showed that the cultivation of Siam plant experienced shoot growth period during one phase of growth 3 times in one period of growth. There are 4 stages of a period of replanting that is 1). Early budgets, 2), full repayment, 3) adult mating and 4) dormancy repayment. Description of flowering development process until the formation of blossom flowers there are 5 important stages traversed by citrus plants are: 1) flower induction, 2) initiation of flowers, 3) development of flower buds towards an thesis, 4) blooming flowers 5) pollination and conception. Siam citrus plants reach the stage of reproductive development, with some or all apical meristem shoots on the branches stop producing leaves and start forming the flower parts according to the typical sequence in the formation of broad flowers apical meristem gradually decreases as the flower parts are formed in sequence.

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1. Introduction

Siam citrus plant (Citrus nobilis var, microcarpa Hasah) a type of fruit that continues to experience increased needs, because it is the most important fruit commodity in Indonesia after mango and banana. Citrus is very liked by the community, because it tastes sweet, tasty, fresh, and peel easily peeled, as well as a source of nutrients and sources of vitamin C. Citrus fruits are a complementary ingredients in supporting family nutrition The market opportunities of citrus fruit is still quite broad, because in addition to the nutritional value is also affordable, but the nature possessed by the cultivated orange plants are seasonal causes when fruit harvest season abundant in the season does not bear fruit even no fruit at all causing expensive prices. Increased population growth, increased income, increased world tourism, public awareness of the importance of nutrition, in addition to the development of agro-industry. Judging from the level of consumption and citrus trade is one of the strategic fruit commodities to be developed, Citrus is very popular by the community seen from the level of consumption about 5.1 kg/capita/year. Currently, Indonesia is the second largest source of ASEAN after. Purnamasari (2010) given the seasonal Siam where the harvest period usually begins in February to September, so there is a time lag that can be utilized by other countries to import citrus fruits to the State of Indonesia. The high volume of citrus import due to the difficulty of the fulfillment of the national orange, one of the causes is faced with the problem of the absence of continuity of production considering the orange Siam is naturally flowering and fruitful seasonal (alternate bearing) that is flowering and fruitful abundance in one season (on-season) as well flowering and fruiting slightly in the next season (off-season), so that effect on price fluctuations. Alternate bearings are influenced by environmental factors, especially microclimate Ogaya & Penuelas (2007) and plant endogenous factors (Berier, 1985a). The most influential environmental factors are air temperature, humidity, rainfall and light intensity (Juan *et al.*, 2007). The flowering of citrus crops often faces constraints, because it requires special requirements to be able to bud, flowering and fruiting (Poerwanto *et al.*, 2010).

The growth of shoots in the plant will determine how much the flowers will be able to emerge and can grow, and this is supported by the endogenous and exogenous factors of the citrus plant. Flowering citrus plants are the flowering compound where the flower emerges from the leaf's armpit or on the tip. The shape is an oval plate and the head of the flower generally is five pieces. Short flower petals with small protective flower petals. Clubs 5 - 8 cm, with the shape of oval round flowers towards the base of the uniform and smell nice (DEPTAN (AGRICULTURE DEPARTMENT), 2013). Flowering on fruit trees is a very complex process that includes many stages of development. Poerwanto (2002) Flowering process is the interaction of the influence of two major factors namely external and internal factors. Arranging flowering there are several ways that can be done, among others: water stress, root pruning, regulation of air and soil temperature, strangulation stem, and the use of growth regulators. Temperature manipulation to regulate flowering is expensive and difficult to implement in the tropics. During the flowering period not all the armpits or buds on citrus plants can flower, this is due not all the armpits or shoots can be induced and transition from the vegetative phase to the reproductive phase so that the overall armpit/bud produces flowers, in other words on one plant at the same time there is armpits/ shoots are flowering and there are no buds/buds that are not flowering. In fact, it is also often happened that the shoots/buds that have been fruitful during the previous fruitful season, can not bloom again in the next season so that the productivity of trees is not optimal in each fruitful season (Lizawati, 2008). Flowering is a complex incident, in which morphological changes occur in the vegetative phase with the start of flowering reproductive time phase marked a shift from relatively simple leaf structure becomes more complex rate structure. The incident was preceded by the cessation of leaf meristem forming candidate and start generating organ of interest (Juan *et al.*, 2007). The ability to transition to the reproductive phase of the plant depends on its ability to induce flower (Hempel *et al.*, 2000).

The important problem faced by the peasant orange, so it is not guaranteed the continuity of production and the high fluctuation of production between harvest season in the harvest season or during the period of on-season fruit production much, on the contrary during the off-season period the number of fruits is very limited even hardly there is a harvest when the price of the fruit expensive. The low-income farmers so less passionate cultivate the plant intensively. Given the natural nature of tropical fruit crops generally alternate bearing flowering and fruiting

abundantly in a season (on-season) and fruiting a little in the next season (off-season), as well as in conjoined oranges, especially experiencing the same thing. At the time of the on-season period on citrus plants occurs the phenomenon of shoots/buds are flowering, and when the off-season periods occur bud/bud does not bloom.

Research Purposes

Based on the problems mentioned above, the purpose of this research are:

1. Getting a picture of flowering and flowering on citrus plants based on above
   a. Observation of the formation of flowering and flowering on the conjoined orange plants. Macroscopically.
   b. Gain science and technology cultivation in the process of formation of flowers through the process of perennials, on the plant Siam.
2. Getting a picture of the time of change from the formation of shoots until the time of flowering of citrus Siam plants.

Target Findings

Output target obtained in this research are:

1. Found the theory of the process of development period of buddy until the formation of flowering period of Siamese citrus plant observed in the field.
2. Description of the time of leaf repayment and when the orange planting flower.

2. Materials and Methods

Using continuous descriptive method, where the research is done continuously or continuously so as to obtain a comprehensive knowledge about the phenomenon of leaf perforations and flowering so that it will produce science of leaf and flowering replanting plants

Siam in relation to getting fruit in a sustainable manner. This research does not use a particular treatment, only focused on the image of the development of leaf blossom and the development of flowering organs on the conjoined orange plants.

2.1 Place and Time

The research was conducted in Banjar Seming, Singakerta Village, Payangan District, Gianyar Regency in 2017. Located at an altitude of 600 - 950 meters above sea level, with a slope of 15 - 19%, with a soil acidity of 5.5. So given additional gypsum fertilizer.

2.2 Materials and Tools

Citrus plants studied are 10 years old, as many as 10 plants from farmers' farmland. Citrus crops have been maintained in accordance with the way farmers cultivate, which is in accordance with the actual conditions in the field. Farmers cultivation mode is cultivated with organic fertilizer in the form of chicken manure with a dose of 25 kg per plant, gypsum fertilizer and irrigation only from rainfall. Routine maintenance is only in the form of, eradication of fungal disease on citrus bark of citrus plants using disease exterminator with dose of 1-2 ml/liter of water and for pest prevention usually used Syngenta with dose 0,2 - 0,4 ml/liter of water, cleaning weeds around the trees, and pruning of twigs that have drifted, twigs burned and then buried. Implementation was conducted in the field of citrus plants as many as 10 plants taken randomly from 36 plants used as research.

2.3 Variables Observed

Field observations were leaf repayment, observed flower growth included:

1) The period begins to appear buds until the appearance of the first interest candidate
2) The length or length of the flowering period, this is calculated since the first flowers appear on the tree until the appearance of the last flower.
3) The amount of interest includes the amount of interest formed and the number of flowers per fall

The research was conducted in Banjar Seming, Kerta Village, Payangan District, Gianyar-Bali which was implemented on one farmer's estate. The altitude of the research sites is 600-925 meters above sea level with the landau topographic hilly with a slope of 15 to 39% to include with the main rock originating from volcanic ash, regusol soil type, sandy clay sandstorm texture. Rainfall averages 2800 mm / year with wet months between April -

October. Soil acidity (pH) is 5.5 - 7.7 moisture average 80% average daily temperature 22 - 28 and good drainage (Village Profile Kerta, 2013). The process of budding that begins when the dormant bud on the shoots or shoots is induced for flowering often does not occur in the overall shoots/buds present in the citrus plant. In the flowering season, often buds or fruit buds that bear fruit during the season of abundant fruits (on-season) can not be flowering in the next season (off-season). Flowering arrangements through cultivation manipulation may be done by adjusting induction for the purpose of obtaining off-season fruit so as to overcome fruit continuity throughout the year. Flowering citrus crops as of now still need to study about the period of flowering to produce flowering on citrus fruit plants, therefore studying the change of environmental factor content especially microclimate which is allegedly strong influence formation of repayment in relation to induced interest or interest induced very relevant done to factor Such factors can be explained.

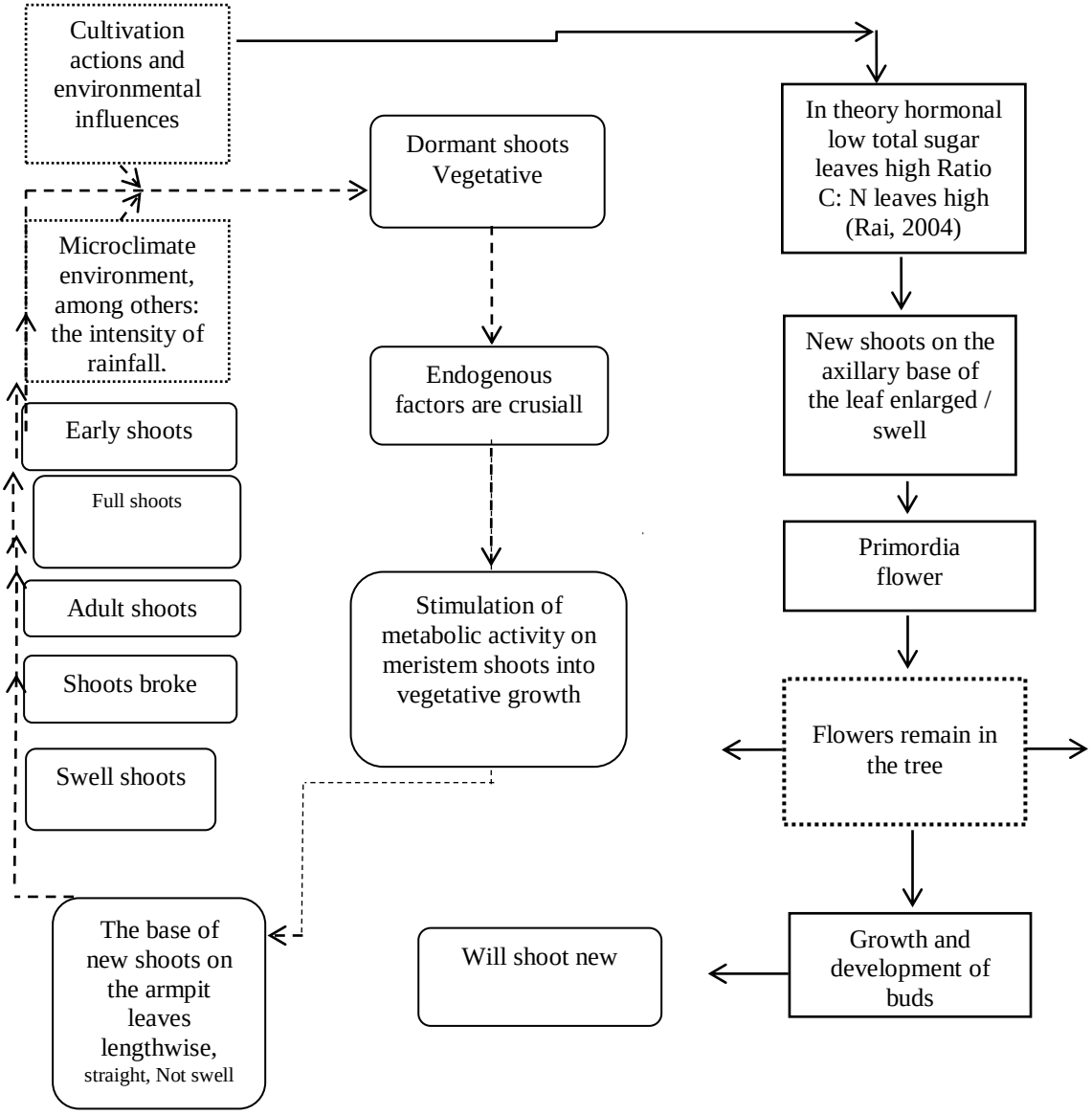
3. Results and Discussions

Observation of shoot growth was done on shoots that grew from shoots of apical citrus plants. Examples of shoots observed were shoots given each mark and a healthy pick was measured continuously. From observations made in the field of shoot growth experienced by Siamese citrus plants are divided into four stages of repayment namely: (1) early shoots, (2) full shoots, 3) adult shoots and 4) dormant shoots. From the observations made on the leaf changes experienced by citrus plants during a period of development in the orange plant Siamese. Orange cultivation plants have two periods, namely on-season and off-season. In observation of the observer is at one period of the off-season period Observation of shoot growth was done on the shoots that grew from citrus plant shoots. Examples of selected shoots are given a sign to see the growth phase and measured their growth as well as the number of shoots that grow counted the number that develops in one plant. Stipulation for citrus seedlings is four stages: Early shoots, full shoots, adult shoots and dormant buds, respective examples: observed every three days. Based on observations during one cycle of growth that is observed in the off-season period, there are four stages of reproduction. This is in accordance with the opinion which takes time since its inception. In the early shoots in (Fig. 1 a), it shows the earliest growing shoot characters on the development of buds in the conjoined orange plants. The signs shown in the early repayment are from the period when the base of the terminal leaf pair at the end of the branch begins to rupture and then the buds appear with the perspective leaves that have not opened until the pair of leaves has been opened with a very transparent green color. The time required from the beginning of observation of the emergence of early buds 25 days from after observations observed in the off-season period. The full shoots are marked with the start of a leaf on the originally transparent green tip turning green and starting to grow full with the leaf bone beginning to look clear (Fig. 1b). The time required until the full bud shoots from the bud starts 35 days observation. Adult shoots, the period in which shoots have clearly distinct leaf color with strong and clear leaf bone with dark green color turns dark green slightly bluish and ends with the appearance of new shoots from the end of the petiole (Fig. 1c). The length of time it takes the appearance of dormant buds from the adult buds for 18 days (53 days from early shoots) .37 days dormant shoots (87 days from early shoots) one cycle of growth in plants consists of periods of active growth and dormant periods. Dormancy buds are a condition in which the rate of metabolism of plants has begun to be low. To know whether the growth cycle of shoots due to environmental influences or plant endogenous effects or the age of the plant or the origin of the seedlings of the plant needs to be further research on the growth of shoots to get the influence of several factors that affect bud growth.

1a. early shoots 1b.full shoots 1c. adult shoots 1d. dormant shoots

Figure 1. Morphological character of several macular growth stages of bud growth of conjoined orange plants

The description of vegetative growth proses to reproductive on Siam citrus plant



Description Image:
- - - - Plant growth leads to vegetative development
____ Plant growth leads to Growth Reproductive

The part of the plant that produces flowers in the fruits is the apex of reproductive, shoot which usually develops from the vegetative apex, which produces leaves and vegetative shoots. The function of the vegetative apex is to produce the growth of the axis in the longitudinal direction, while the reproductive apex function is to form a wider meristem region, a part of which the various parts of the flower develop. Siam citrus plants reach the stage of reproductive development, then some or all of the apical meristem buds on the branches stop producing leaves and begin to form the flower parts according to the typical sequence. In contrast to vegetative growth such as leaf formation, its apical meristem widens again during a period of development. The formation of apical meristem buns gradually diminishes as the flower parts are formed in sequence. The order of the formation of the flower parts of the

citrus plant lasts from the inside out, from sepals. Petals, stamens, and pistils. This opinion is supported by Lyndon (1990), in most fruit plants the sequence of flower formation from outside to inside that is starting from petal (corolla) and lastly forming pistil (pistil). Flowering morphology is the occurrence of a change from the vegetative phase to the formation of flower organs, where flowering is a very complex event. The success of plants transitioning from the vegetative phase to the reproductive phase depends on the ability of plants to induce flowers. According to Koshita *et al.,* (1999) Flowering induction is a process by which external stimulation occurs to the point of growth and it induces the primordia of interest initiations of flowers on citrus plants occurs when the buds on the armpits of the terminal leaf begin to enlarge, seen in macroscopic or visually seen (Fig. 2, 2a). In a population of mangosteen plants are sometimes found some fruiting plants, while other plants are unfruitful and some plants are able to bear fruit faster and/or later with a time difference of about 1-3 months (Poerwanto, 2003). According to Rai *et al.,* (2010) plants in similar environmental conditions but exhibiting different microscopic flowering behavior may be due to the presence of endogenous conditions and genetic information on plants that repress (depression) and the appearance (depression) of interest induction. According to Krajewski & Rabe (1995) the development of the flower undergoes changes such as (1) the relative size of the primordial flower against the apical dome when compared to the size of the leaf primordia against the apical dome. (2) the change of the angle of the divergence primordia so that the arrangement of primordia forms whorls, (3) internodes depression, (4) primordia covering the peak of meristem and (5) miosis occur. According to Lyndon (1990) of the increasing rate of growth temporarily in apices is the transitional character of leaf formation to flower formation. Reduced primordial interest rates cause the number of tissues associated with each primordium is also reduced, so as not to form an internodes on the flower. Thus the cells that normally develop form the vegetative internodes, do not form on the development of flowers. the leaves of the leaves are dark green, then there is a change in the color of light green leaves transparent, then followed by changes in the start of the candidate will flower with signs of inflated on the surface of leaf buds. The development of citrus flower buds consists of four phases seen morphologically include 1) induction phase, visual observation has not occurred changes in the shoots or armpits of plants. 2) differentiation, marked by the emergence of buds on the armpits 3) began to appear flower nipple on shoots and flowers begin to blossom (figure 2. Morphology of flower development of Siam citrus plant) Flowering is a determining factor in the formation of fruit in fruit horticulture crops. The process associated with the Siam Orange plant involves the initiation of shoots followed by the appearance of the flower, and subsequent deflation of the shoots.

2a. flower induction 2b. initiation of flower 2c. Flower buds 2c. Blooming flower

Figur 2. Picture of the flowering of the Siam citrus plant

According to Rai *et al.,* (2010) the development of the flower undergoes changes such as (1) the relative size of the primordial flower against the apical dome when compared to the size of the leaf primordia against the apical dome. (2) the change of the angle of the divergence primordia so that the arrangement of primordia forms whorls, (3) internodes depression, (4) primordia covering the peak of meristem and (5) miosis occur. According to Sulistiawati & Kartini (1916) of the increasing rate of growth temporarily in apices is the transitional character of leaf formation to flower formation. Reduced primordial interest rates cause the number of tissues associated with each primordium is also reduced, so as not to form an internodes on the flower. Thus the cells that normally develop form the

vegetative internodes, do not form on the development of flowers. The flowering period of citrus plants is characterized by morphological features, among others: the change of leaves is from dark green leaves, then there is a change in the color of light green leaves transparent, then followed by changes in the start of the candidate will flower with signs of bulging on the surface of leaf bud . The development of citrus flower buds consists of four phases when viewed morphologically include 1) induction phase, visual observation has not occurred changes in the shoots or armpits of plants. 2) differentiation, marked by the emergence of buds on the armpits. 3) began to appear flower nipple on shoots and flowers begin to blossom (figure 2. Morphology of flower development of Siam plants) Flowering is a determining factor in the formation of fruit in fruit horticulture crops. The process associated with the Siam Orange plant involves the initiation of shoots followed by the appearance of flowers, and subsequent differentiation bud as apical and this situation usually takes place in the tropics and subtropics Flowering process that begins when the armpits/shoots of dormant leaves to be induced into flowers, often do not occur in the whole armpits / buds Flowering process contains a number of important stages, all of which must be successfully held to obtain fruit. Each of these stages is influenced by plant endogenous and exogenous plant factors (Hanke *et al.*, 2009). Furthermore, according to Lyndon (1990) can happen.

Flowering on fruit plants, leaves must be able to produce the flowering stimulant substance required by the apex or stop the production of inhibitors. So is the apex's ability to receive a response and receive sufficient flower stimulus and stop receiving inhibitors from any part of the plant and then proceed to the formation of the flower organ in the appropriate order. Therefore the length of the juvenile period depends not only on the inability of the leaves to produce a flowering stimulus but also depends on the inability of the apex to receive the stimulus. According to Kowalska (2008) stages of flower development include flower induction (avocation), flower initiation, flower bud development toward anthesis, and anthesis. The achievement of the stage of reproductive development of the plant is marked on some or all of the apical meristems of buds on the leaf stop branch, and the flower begins to form in accordance with the sequence typical of the plant species. In most types of fruit crops, the order of the formation of flower parts lasts from the inside out from the sepals (calyx), petals (corolla), stamen (stamen) and pistil (David Horbath, 2009).

Flowers are branches with deformed leaves, whose growth is limited, short-circumscribed, and the leaves have changed shape. The lower leaves are called green calyx, the next is called the crown or crown (corolla) of a more beautiful color, the third leaf series is called the stamens (statements) the circumstances are all rolled up and the uppermost one or the very end that the condition is attached to one is called with pistil (flower) The flower pedicle (pedicle) is located under the flower. The seat of the flower that is at the base of the flower is called Receptaculum with the end of the flower stalk that is usually widened Darmawan (2014) growth in shoot apical meristem (SAM) during the vegetative phase forms a shoot architecture with primordia that later develops into leaves / or shoots or vegetative lateral branches (Koshita *et al.*, 1999). After the transition to generative growth, most or all of the apical meristems make up the interest. Dennis & Neilsen (1999) suggests that the development of flower buds is different from the development of vegetative shoots in some very dramatic terms: (1) unlike most vegetative buds, the flower buds are determinate and formed, (2) the initiation and development of buds the lateral is very depressed when flower buds are formed, and (3) the number, arrangement and morphology of the growth flower organ stops after the last reproductive organs are highly specific depending on the species.

Specific changes in the apex occur during flowering, this occurs on the shoot, in she meristem, and in the flower. Changes that occur at the shoot include precocious axillary buds that cause changes in branching, leaf shape changes and changes in “phyllotaxis”. Likewise, in the case of aquatic meristems, there are changes, such as the occurrence of temporarily increased growth rates, apical expansion, increased primordial initiation rates and occasional changes in induced induce synthesis, such as RNA synthesis and the formation of new proteins, as well as an increase in the number of mitochondria and respiratory rate increased. The development of the flower undergoes changes according to Rai *et al.*, (2010), among others: (1) the relative size of the primordial flower against the apical dome when compared to the size of the leaf “primordia” against the apical dome. (2) the change of the angle of the divergence “primordia” so that the arrangement of primordia forms whorls, (3) “internodus” depression, (4) “primordia” covering the peak of meristem and (5) “miosis” occurs. According to Lyndon (1990) of the increasing rate of growth temporarily in apices is the transitional character of leaf formation to flower formation. Reduced “primordiar” interest rates cause the number of tissues associated with each “primordiar” is also reduced, so as not to form an” internodus” on the flower. Thus the cells that normally develop form the vegetative” internodus”, do not form on the development of flowers.

Factors affecting flowering and fertilization are environmental, genetic, hormonal, and nutritional factors (Berier, 1985a). Environmental factors that are very influential on the appearance of interest among others air temperature,

air humidity, rainfall and light intensity (Ogaya & Penuelas, 2007). In plants fruits naturally, induction flowering occurs in the dry season, because of stress water and flowers appear before the season rain (DEPTAN (AGRICULTURE DEPARTMENT), 2013). Naturally citrus is an annual crop that has seasonal fruiting properties, ie flowering only once a year or twice a year if it has a long dry period. The circumstances caused an abundance of production in the fruitful season and declining prices. In addition, orange fruit in Indonesia is very short, about 4 months starting from April to July (Poerwanto, 2003). Initiation of flowers on citrus plants occurs when the buds on the armpits of terminal leaves begin to enlarge. Darmawan (2014) reported that observations made in the field found that there was a limited amount of seasonal "mangosteen "fruit, where the identification results were found in West Sumatra Province, wherein a population of "mangosteen" crops, sometimes some fruits were found, while other plants are unfruitful and some plants are able to bear fruit faster and/or later with a time difference of about 1-3 months). According to plants that are in the same environmental conditions but exhibiting different flowering behavior may be due to the presence of endogenous conditions and genetic information on plants that repress (depression) and the appearance (depression) of interest induction.

4. Conclusion

a) Observations made on the growth of shoots in citrus plants in Banjar Seming, Kerta Village, Payangan District, Gianyar Regency during one period of growth experienced 4 phases of shoot growth, namely a) early repayment, b) Adult dating, c) Full fruits and d) the dormant period of dormancy. Flowering is one of the developmental processes that must be timely. Siamese citrus plants have four flowering periods namely a) "initiations", b) "diffrensiasi", 3) flowers bloom and 4) fall of flower jewelry. Growth and development in winter will stop. In the next season will be flowering, the number of flowers that can grow as many as 1917 flowers/trees.
b) Siam citrus plants reach the stage of reproductive development, with some or all apical meristem shoots on the branches stop producing leaves and start forming the flower parts according to the typical sequence in the formation of broad flowers apical meristem gradually decreases as the flower parts are formed in sequence. The order of the formation of the flower parts on the citrus plant lasts from the inside out, starting from sepals. Petals, stamens, and pistils. The citrus plant reaches the development stage of reproductive development with a mark of some or all of the apex buds on the branches stop producing leaves and begin to form parts of the flower according to the typical order. In the formation of broad flowering apical meristem gradually diminishes when the flower is formed in sequence.
c) The sequence of the formations of the flowers on the planting of Siam citrus plant from outside to inside that is ranging from sepal, petal, stamens, and pistils. In contrast to vegetative growth such as the formation of leaves that meristem apex widened again during a period of development.

Conflict of interest statement and funding sources
The author(s) declared that (s)he/they have no competing interest. The study was financed by Warmadewa University.

Statement of authorship
The author(s) have a responsibility for the conception and design of the study. The author(s) have approved the final article.

Acknowledgments
Praise gratitude authors the presence of God all night, so that this simple writing can be solved can finish this paper thanks to some help from:
1) The Rector Warmadewa University for his permission to conduct research
2) The Dean Agriculture Faculty Warmadewa University, the volunteered to provide some facilities so that the research could run.
3) Much obliged for LEMLIT Warmadewa University which has funded Decentralization Research Competitive Grant in 2017. Thanks also go to all those have helped this research.
4) Thanks to the editor-in-c Thanks to the editor-in-chief of IRJEIS who has helped in the acf of IRJEIS who has helped in the acceptance of my writing that is still far from perfect all the parties that I can not mention one by, at the end of the word I say many thanks to all parties.

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