

THE USE CONCENTRATION OF IBA HORMONE TO THE GROWTH *Tetrastigma glabratum* Rooth WITH SOME TYPES OF PROPAGATION PLANTING MEDIA

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ABSTRACT

In the initial survey conducted by the researchers found that villagers had exploited growing Blumah *Tetrastigma glabratum* or name of the region alley walikadep started since time immemorial very day. This resulted in the existence of exploitation *Tetrastigma glabratum* plants in their natural habitat in protected forests Prau mountain in Central Java. If exploitation is not addressed, then this plant will be threatened depleted or become extinct. In terms of ecology, when a species becomes extinct then it will have an impact on the extinction of other species. In addition, the presence of these plants in their natural habitat is also influenced by external factors such as floods, erosion, landslides and forest fires. To determine the effect of several concentrations of hormones IAA (indole butyric acid) Yates clonex to root growth and root formation process plant *Tetrastigma glabratum*. The Method pure experimental research. Each treatment plant propagation *T. glabratum* who had let the treatment of propagation on the rod smeared / dosed, respectively 500 ppm, 1000 ppm and 2000 ppm. wrapped with planting medium. Each sample 3 repetitions control without hormones. A planting medium: sand, soil, ferns and Jeffy powder and mixed media, and then tied up and labeled left for 3 weeks. Total propagation experiment is each dose of 5x3 replicates x 4 kinds of media. Number 60 stem propagation experiments. Based on the results of the study showed that a dose of 2000 ppm IBA most root growth and the least number of roots at a dose of 500 ppm. Average of 5 planting medium from the finest powder ferns.

Key words: concentration, hormones, growth of roots, planting

Introduction

In the initial survey conducted by the researchers found that villagers had exploited growing Blumah *Tetrastigma glabratum* or name of the region alley walikadep started since time immemorial very day. This resulted in the existence of exploitation *Tetrastigma glabratum* plants in their natural habitat in protected forests Prau mountain in Central Java. If exploitation is not addressed, then this plant will be threatened depleted or become extinct. In terms of ecology, when a species becomes extinct then it will have an impact on the extinction of other species. In addition, the presence of these plants in their natural habitat is also influenced by external factors such as floods, erosion, landslides and forest fires. Mount Prau (2565 masl) is located in the Dieng Plateau, Central Java, Indonesia. Gunung Prau located at coordinates 7 ° 11'13 "N 109 ° 55'22" E

Genetic diversity is an economic resource, tourism, health and culture. The existence of genetic diversity itself is not evenly distributed in each region, depending on the area ecosystem (Wardana, 2002). At this time a loss or reduction of biodiversity take place more quickly with the increasingly widespread incidence of changes in habitat, global warming, pollution (contamination), and various forms of pressure for various purposes of exploitation. One of the plant genetic sumbaerdaya named area walikadep, similar scientific name *Tetrastigma* believed by masyarakat around the protected forest in Central Java's Mount Prau berkasiat drugs and drugs used by people around the traditional hereditary (Lianah, 2013).

Walikadep plant has the scientific name *Tetrastigma glabratum* (Blume) Planch. *Tetrastigma* (Botanic garden, 2010) is a genus of plants from the grape family, Vitaceae Familia. The plants are plants or vines climbing liana with tendrils. This species can be found in subtropical and tropical regions of Asia, Indonesia, Malaysia, and Australia, where they grow in primary forest. Sources of the Forest Department Sarawak (2010) mentions that the species of this genus *Tetrastigma* famous as the sole host / parasite host plants in the family Rafflesiaceae. One of them is the *Rafflesia Arnoldi* which produces the largest flower in the world. *Tetrastigma* synonym names including *Cissus* (Krisantini, 2014). This is the kind *Tetrastigma* liana plants (Ren H., J. Wen 2007). including a host of flowers *Rafflesia* (Meiyer, W. 1997, Zuhud 1998).

Description *Tetrastigma* plants according to previous studies (Heyne, 1987), Acta Botanica Sinica. (2003) and included family: Vitaceae, genus: *Vitis* categorized and woody vines that grow in tropical rainforests primer on wet climate with rainfall 2500-4000 mm. *Tetrastigma* plants including vines (lianas) is a plant rooted to the ground, but has a long stem rather slender often winding spread and metastasized above the forest canopy. Liana stem is often twisted or get caught in a typical morphology, structure liana material is different from the vessel tree, channeling of water in a large timber diameter and clearly visible naked eye. Type *Tetrastigma* sp have active substance as a medicine or herbal medicine trdisonal (Din LB, et al, 2002, Liu D., at all in 2002, Xu C, 2008, Sofianti at all, 2008).

The World Health Organization or WHO (2004) estimates that 75-90% of people in the world who live in the countryside still held him against medicinal plants as the main option in the treatment and health care. While more than 21,000 types of plants in

the world are used in health and beauty treatments (Barwa, 2004). This shows how important the types of medicinal plants in the health care community. The harmony of ecological processes will thus quickly changed when one of its components disturbed. Data from Kendal district offices in 2009 shows that in the village Blumah occurred infant mortality 23%, 32% and mature infants as much as 12%. This indicates that infant and child mortality is so high that the needs of the drug is needed. Therefore villagers Blumah always looking for alternative drugs of biological resources come from a protected forest area adjacent to the Prau mountain village areas.

Tetrastigma glabratum including endemic plants from the protected forests of Mount Prau is a wild plant because it has not been cultivated. Plant propagation is done naturally by seeds that are naturally germinated around its parent or wind or water. Sprouts that grow on the forest floor is taken for ex-situ conservation can not always be alive because it must comply with the ecological parameters. Propagation by cuttings is quite difficult to always die dry brownish so rarely done. One other efforts by tissue culture propagation is done in laboratory tissue culture Bogor Institute of Agriculture also dry dead brownish color.

Data phytochemical *T. glabratum* that have been studied Lianah (2013) contains a total phenols 45.70 ppm and flavonoids 228.12 ppm. It also tested positive for steroids and terpenoids flavonoids, terpenoids and steroids suspected drug berkasiat. The maximum limit of the content of phenol in water that is allowed to be drunk is 0.0002 ppm (Mulyasuryani et al., 1997). It turned out that plants containing high phenol hard to be bred in a vegetative included in the cuttings.

Over exploitation of medicinal plants have an impact on the presence of plants in their natural habitat. If exploitation is not addressed, then the plants will be threatened *T. glabratum* depleted or become extinct. In terms of ecology, when a species becomes extinct then it will have an impact on the extinction of other species. In addition, the presence of these plants in their natural habitat is also influenced by external factors such as floods, erosion, landslides and forest fires. Data on flash floods, landslides and erosion have occurred at Mount Prau in 1991 and the data shows also been a fire in 1994. It needs to be done upanya in-situ conservation and ex-situ conservation to protect these species.

T. glabratum species protection efforts in order to remain sustainable then further research on breeding *T. glabratum* using the hormone. The process of giving the hormone must consider the number and concentration in order to get a good root system in a relatively short time. Concentration and the amount depends on factors such as age propagation material, time / duration of the hormone, the route of administration, the type of hormones and cuttings systems used (Yasman and Smits, 1988).

In general kinds of hormones or growth regulators can be divided into three main groups, namely auxin, cytokinin and gibberalin. For rooting, the most decisive is the hormone of the auxin group. This hormone is naturally already present in the plant but to further accelerate the process of rooting cuttings should be added in an amount and a certain concentration to stimulate rooting (Yasman and Smits, 1988). Auxin many arranged in meristem tissue at the ends of the plants such as shoot, flower buds, leaf buds, and others again (Dwidjoseputro, 1990). Kusumo (1984) states that arise in the rooting of cuttings caused by auxin impetus derived from the buds and leaves.

Healthy shoots in the stem is a source of auxin and an important factor in rooting. Total levels of auxin contained in organ cuttings varies. In cuttings which have higher levels of auxin, are better able to grow roots and produce higher survival rates cuttings than cuttings which have low levels. As we know that auxin is a type of growth hormones are produced by plants and serves as a catalyst in the metabolism and acts as a cause of cell elongation (Alrasyid and Widiarti, 1990). There is another hormone which has the chemical content is more stable and longer workability so that it can stimulate the formation of roots hormone IBA (Indole Butyric Acid).

IBA hormone given to propagation will remain at the site of administration so as not to inhibit the growth and development of shoots. This hormone stimulates the growth and development of root nutrient absorption so that the system will run well so that the plants will develop optimally. To speed up the rooting propagation required special treatment, namely by giving the hormones from the outside.

Based on the above issues should be conducted experimental research to breed *T. glabratum* in propagation by hormone treatment. The aim of research to determine the propagation by using IBA hormone concentrations and appropriate planting medium to root growth and root formation process *T. glabratum* plants in the green house in the village which still has some similarities Blumah ecology of temperature, light, altitude, humidity, rainfall, intensity light, soil pH and the pH of the water is not too different adalaah. Expected environmental parameters *T. glabratum* growth equal to the original habitat of protected forest Prau mountain. Because Blumah village is a village that is directly adjacent to Mount Prau Protected Forest.

Research design

Research Methods experiment, each treatment plant propagation *T. glabratum* who have give treatment to the rod smeared / IBA hormone dose given each of 500 ppm, 1000 ppm and 2000 ppm and 4000 ppm. Propagation wrapped with planting medium. Each sample 3 repetitions control without hormones. Each -masing planting medium in the form of: sand, soil, fern powder and mixed media, and then tied up and labeled left for 3 weeks. Total propagation experiment is each dose of 5x3 replicates x 4 kinds of media. Number 60 stem propagation experiments.

Propagation research that had been treated, preserved in the green House didesa blumah slope of Mount Prau directly adjacent to the protected forest Prau mountain where the temperature is in the range 18 ° C-25 ° C) and 1000-2500 Lux light intensity. height of 700 m, then performed live observations percentage propagation, propagation percentage form roots, the first day of the

emergence of roots and root morphology were analyzed descriptively as well as the number and length of root for 3 weeks. This area has an average rainfall of 2,000 mm / year. Daily air temperature in the protected areas of Mount Prau ranged between 62-82%. Location and Time Location research in the area of green House size Blumah 3mx6mx3m built in the village in the land of the villagers village Jiwan subdistrict Blumah Plantungan Kendal regency, Central Java Indonesia for 3 months (Oktober 2014 to December 2014). Then percentage of survival was observed propagation, propagation percentage form buds, the first day of the appearance of buds and bud morphology were analyzed descriptively as well as the number and height of shoots were analyzed statistically using the program SPSS 16.0. Further trials using Duncan New Multiple Range Test (DNMRT) at level 5% chance.

Materials used consist of shoots walikadep (*Tetrastigma glabratum*) that already exist in the green house them and planted with cuttings since June 2010 taken from Forest Preserve Mount Prau., Hormone IBA (Indole Butyric Acid) with a concentration level of 0 ppm (as a control) , 500 ppm, 1000 ppm, 2000 ppm and 4000 ppm, and a growing medium (sand, soil, fern powder, a mixture of compost). Tools used: home hoods, pruning shears, hands sprayer, knife, measuring ruler, measuring cups, plastic buckets, spoons, analytical balance, insulation, plastic wrappers media and stationery.

Experimental design used in this study is completely randomized design (CRD) with 5 treatment concentration levels of hormones IBA (Indole Butyric Acid) different, where each treatment was repeated three times and in each replication consisted of 60 seedlings propagation shoots. The linear model is used as follows: $y_{ij} = \mu + U + C_j + E_{ij}$, where:

y_{ij} = values of observations on replay to i, j to the treatment,

U = the average value of hope, C_j = effect of treatment IBA hormone concentrations to j , and E_{ij} = experimental error.

The concentration level of hormones: T0 = 0 ppm (control) T1 = T2 = 500 ppm 1000 ppm 2000 ppm T3 = T4 = 4000 ppm.

Responses were measured to observe the effect of treatment is hormone concentrations IBA propagation percent live shoots were rooted and is expected to grow into a plant that is perfect, after a 3-month-old seedlings. The analysis will continue also to root length (cm), number of roots (pieces), high gain propagation shoots (cm), increase leaf (leaf), and root dry weight (mg). Data processing observations percent so shoot cuttings rooted expressed in percent (%) first ditransformasikan into arcsin $\sqrt{\%}$, then use a wide Fingerprint Analysis Random Pattern complete.

Research Resuth

Based on research on the propagation *glabratum* *Tetrastigma* obtained as:

In Table 1, we can see the results of different test average root length between IBA concentration level, shows that there are significant differences between the treatment of hormone IBA concentration level of 500, 1000 ppm, 2000 ppm and 4000 ppm with treatment without hormones. Between the level of concentration of 1000 ppm to 2000 ppm also showed significant differences. But between the concentration level of 500 ppm to 4000 ppm showed no significant differences. The concentration of 2000 ppm growth of roots on medium reaches 16-54 fern powder being at a concentration of 4000 decreased to 11-15 roots. This shows that the most good for the propagation konsentrasi *Tetrastigma glabratum* concentration of IBA 2000 ppm dan powder fern growing media.

Table 1 Root Growth Average Test Results On PLANTING MEDIA

No	IBA concentration (ppm)	Sand	Land	powder Ferns	Mixed Compost
1	0	1-2	0-1	3-5	2-3
2	500	6-9	10-13	9-30	3-8
3	1.000	9-17	6-9	11-18	4-9
4	2.000	11-21	10-22	16-54	5-17
5	4.000	10-21	3-7	11-15	2-4

After a period of 3 months, so propagation rooted percent after planting reached 48%. The highest percent in each test can reach 90 percent in the level of concentration of 2000 ppm, while the lowest percent to 15 percent on treatment without hormones. Data can be seen in Table 2 as follows:

Table 2. Comparison of Growth of long roots, dry weight, and number of leaves

No	IBA concentration (ppm)	long roots (cm)	Biomassa (mg)	number of leaves	Persen (%) Life
1	0	1-2	1-3	0	15
2	500	6-1	4-6	3-5	38
3	1.000	9-17	6-9	13-18	62

4	2.000	11-21	13-22	19-28	90
5	4.000	10-18	3-7	13-15	45

From table 2 it can be seen that the growth of root length, biomass, leaf number and present life after implantation is that concentration of 2000 ppm showed positive growth compared with concentration IBA (0,500,1000, dan 4000) ppm. root length at a dose of 2000 ppm IBA amounted to 11-21 root length, leaf number 19- 28, 13-22 and Presentations living biomass of 90%. being the least present life is 15%.

Results documentation of propagation can be seen in the image below as follows: Image documentation example *Tetrastigma glabratum* Propagation practice results. (14/10 - 7/11/2014)

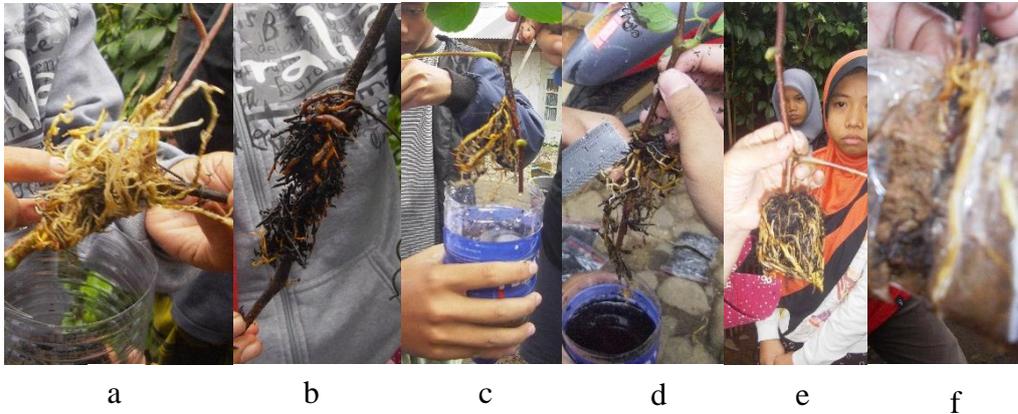
Figure 1: The growth of new shoots of Propagation *T. glabratum* after 3 months



Figure 2: The results of root growth propagation *Tetrastigma glabratum* To IBA hormone



Figure 3: The results Morphology of root growth propagation *Tetrastigma glabratum* to planting media IBA 2000ppm



- Information Figure 2: Planting Media
- Powder Ferns media : (> 50 White color)
 - Land media (> 50 black rot)
 - Sand media (< 6, brownish white color)
 - Sand media (< 13 blackish brown color)
 - Mixedcompost media (> 17 black root rot)
 - Mixed Compost media (> 9 black root rot)

Discussion

Based on the results of the above propagation can be explained that one of the efforts to increase the percentage growth or propagation of cuttings is to use a type of hormone IBA (Indole Butyric Acid) which is a type of hormones used to stimulate root formation. *Tetrastigma glabratum* plant breeding already done by cuttings always a failure. Therefore IBA hormone used for propagation of cuttings have some constraints, namely the growing substance is not distributed evenly so that growth is not uniform cuttings. IBA has a chemical content that is more stable and longer workability so that it can stimulate root formation. IBA (Indole Butyric Acid) provided on the cuttings will remain at the site of administration so as not to inhibit the growth and development of shoots. This hormone stimulates the growth and development of root nutrient absorption so that the system will run well so that the plants will develop optimally. Hormones are molecules whose activities regulate important metabolic reactions. These molecules are formed in the organism with metabolic processes and does not work in nutrition (Heddy, 1989). Plant hormones can be interpreted widely, both artificial and genuine and that encourage or inhibit the growth (Overbeek, 1950 in Kusumo, 1984). At low levels of certain hormones / chemicals to grow will encourage growth, while at the higher levels will hamper growth, poisoning, even deadly plant (Kusumo, 1984).

There are several kinds of hormones auxin from this group, among others, is IAA (Indole Acetic Acid), NAA (Naphthalen Acetic Acid) and IBA (Indole Butyric Acid). How estab granting of hormones for rooting cuttings, for example with pasta lanolin, bent uk aqueous solution, concentrated solution form, giving the flour, and spraying. From the way - the way the administration with an aqueous solution is considered the most effective way (Kusumo, 1990). How to create standard solutions hormone use alcohol 95 percent, then diluted with water. Normally used concentrations of 0.0005 to 0.01 percent depending on the plant species and types of hormones used then the base of the cuttings with a size of 2 cm soaked for several hours to allow the hormone can be absorbed. Kusumo (1990) suggests that the factors that influence the success of the hormone are: (a) The condition of the mother plant such as age, fertility and cuttings taken part. (B) Factors in rhizokalin and substances such as organic food. 5. Advantage Horm on IBA (Indole Butyric Acid) Other substances outside the plant body turned out to have the same effect as auxin, and IAA, these substances have tabled cicin containing a double bond as the core, while the ring there is a circuit that have carbosil group. Substances that are indole butyric acid, naphthalene acetic acid α , β naphthalene acetic acid, acid β naftoksiasetat, acid 2,4-dichloro fenoksiasetat (Dwidjoseputro, 1990, Ridha Permata Sari, at all, 2013).

IBA hormone is a hormone that is included in the group of auxin. Besides it is used to stimulate rooting, IBA hormone also has other benefits such as increasing the germination, stimulate fruit growth, prevent hair loss, the driving activities of the cambium and others (Kusumo, 1990). Wudianto (1993) suggests that the IBA has better properties and effective than IAA and NAA. Thus the most suitable IBA unt uk stimulate rooting activity, because its chemical content is more stable and longer workability. IBA given to cuttings administration is in place, but the IAA is usually easily spread to other parts thereby inhibiting the development of the growth of shoots, while the NAA has a range (range) concentrations narrow so that the limit concentrations of these substances are toxic concentrations very close to optimum. (Aminah, 1994)

Plants used to study the effect of hormone IBA on root growth of plants *Tetrastigma glabratum* which came from a protected forest mountain north Kedu Prau wiyah. Preferred is tranting 0.5-1.0 cm diameter rod with a 2-3 tanjumlah petiole. The treatments were the fifth variation IBA hormone concentrations, ie 0 ppm, 500 ppm, 1000 ppm, 2000 ppm, each treatment was repeated three times to obtain 60 units experiment.

Based on the survey results revealed that the higher the concentration of IBA, the positive effect on the growth of roots in cuttings of plants that include the percentage *Tetrastigma glabratum* propagation roots, root length, and root biomass. Treatment with an increase in the concentration of 2000 ppm, while the highest in the treatment with concentrations of 500 ppm to give effect to the percentage of rooted cuttings, root length, and root biomass were low. At a concentration of 0 ppm which is the control does not indicate the presence of root growth. At doses of 4000ppm is decreasing.

Planting medium sand, soil, pollen from tree ferns and media mix of compost, which is best of ferns powder. This is because it is more sterile powder ferns and roots easily penetrate because there is an air cavity so that the roots to breathe easy. In addition fern powder can still save water in the cell-cell. As for the root sand media is also easy to grow, but the cavity air can enter the water easily lost because the sand is not able to hold the water, so that the roots can grow well, but better than the fern powder. Media soil and compost mixture proved unfavorable growth and blackish brown presumably because the root cells die and decay, it means that there are indications of spoilage bacteria in the soil and mix compost media. Also the media of soil and compost mixture smart save the water, so the excess water causes less breathing root cause tissue cell death root rot and propagation fails. So the media for propagation *Tetrastigma glabratum* most appropriate in this study is a fern powder better than the soil, sand and compost mixture.

Conclusion

Based on the results of research on propagation by treatment with hormone IBA IBA showed that a dose of 2000 ppm at most root growth and the least number of roots at a dose of 500 ppm. From the observation on the effect of hormone treatment IBA on root perumbuhan *Tetrastigma glabratum*, showed that the addition of IBA positively correlated to root growth. From the data known to increase with increasing dose IBA can enhance root growth. At 0 ppm treatment showed no growth on the roots, while at a dose of 2000 ppm showed the best response to the growth of roots. At a dose of 4000 ppm root growth tends to decline it because of the high IBA spur the formation of ethylene which can inhibit root growth.

Planting medium sand, soil, pollen from tree ferns and media mix of compost, which is best of ferns powder. This is because it is more sterile powder ferns and roots easily penetrate because there is an air cavity so that the roots to breathe easy. In addition fern powder can still save water in the cell-cell. As for the root sand media is also easy to grow, but the cavity air can enter the water easily lost because the sand is not able to hold the water, so that the roots can grow well, but better than the fern powder. While on the ground and mixes compost media proved less good root growth and blackish brown presumably because the root cells die and decay, an indication of spoilage bacteria in the soil and mix compost media. So the media for propagation *Tetrastigma glabratum* most appropriate is the fern powder.

Sugestion

Utilization of helping people to cultivate of propagation that have resulted from these studies and the people no longer need to exploit in their natural habitat in protected forests Prau mountain. Dissemination of the most important academic benefits that these results can be used as a basis for decision making in breeding at *Tetrastigma glabratum* as an herbal remedy derived from protected forests of Mount Prau. Recognition of the relevant parties, especially rural communities Blumah accept the results of propagation for cultivation or planted in the garden merka respectively.

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