

## Increasing Added Value of Chrysanthemum through Cultivation Improvement in Agro Puduk Lestari Ornamental Plant Farmers Group

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### ABSTRACT

Chrysanthemum (*Chrysanthemum* sp.) is an ornamental flower commodity that has high economic potential value. Based on the results of initial visits and discussions with the community, it is known that the problems that farmers complain about most are seed procurement problems and leaf rust problems. The aim of this research is to increase the added value of farmers, using extension and training methods. The solutions that will be implemented regarding the problems faced by Farmer Groups are, (1) Increasing knowledge of plant propagation techniques through good and correct seeds and (2) Increasing knowledge about how to control leaf rust disease.

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## **INTRODUCTION**

Chrysanthemum (*Chrysanthemum* sp.) is one of the ornamental flower commodities that has high economic potential value. Chrysanthemums are widely known as ornamental plants and complement various decorations. This flower is often known as one of the "King of Cut Flowers" which has many fans. In addition to various shapes and types, this flower has an interesting color combination. Apart from its beauty, chrysanthemums also have high economic value (Purwono et al., 2014). Based on BPS (2018) the production of cut chrysanthemum flowers in Indonesia in 2015 was 442,698,194 stalks, while in 2016 the production of chrysanthemum flowers decreased significantly by 9,598,049 stalks or 2.17%. The decrease in chrysanthemum production can be caused by inefficient cultivation processes.

Efforts to increase the productivity of chrysanthemums can be carried out by controlling plant quality in a more efficient cultivation system. The cultivation system can be started from the nursery. Good quality chrysanthemum seeds can be obtained through vegetative propagation using shoot cuttings, because seedlings from shoot cuttings have several advantages compared to seedlings from seedlings (Putri & Sudiatna, 2009). The quality of the cuttings greatly affects the growth of chrysanthemums. Healthy and excellent cuttings have the potential to produce plants that grow optimally, which in turn can produce good quality flowers. Breeding by cuttings has several obstacles. One of the obstacles to seed propagation by chrysanthemum shoot cuttings is sub-optimal rooting which results in a very high wilting rate of chrysanthemum shoot cuttings. In addition to seed problems, leaf rust disease in chrysanthemum plants is also a problem that must be overcome to increase the added value of farmers.

Chrysanthemum is a type of flower that is popular in Indonesia. Interesting flower colors and flower shapes, as well as having many types, make it popular with many people. However, this plant is very susceptible to rust disease caused by the fungus *Puccinia horiana* which is the main disease of chrysanthemums. Although it does not kill the plant, fungal infection will reduce the health and vigor of the plant, thereby affecting the production and quality of flowers, as well as reducing the aesthetic value of the chrysanthemum due to the presence of pustules (rust).

## IMPLEMENTATION AND METHODS

Implementation of community service program activities in groups the Agro Pudak Lestari farmer group, Pancasari Village, Sukasada District, Bulelang Regency, involving several related parties. The agencies involved included the Community Service Institute (LPM) of Warmadewa University, the Faculty of Agriculture, Pancasari Village, and the Agro Pudak Lestari farmer group. The method of implementing this program is by giving theory and practice which is delivered directly between farmers and trainers with group participants totaling 17 (seventeen) people.

The stages carried out in the implementation of Community Service activities include:

1. Survey and determination of service location and determination of the number of participants
2. Handling the problems faced by farmers
3. Identification of needs and expectations of farmer groups
4. The solutions given to the problems encountered
5. Implementation of activities through the provision of theory and practice
6. Monitoring and evaluation of activities and results

## RESULTS AND DISCUSSION

### Chrysanthemum Flower Plant Cultivation Process:

#### 1. Know the conditions for planting chrysanthemums

Chrysanthemums can grow well under the following conditions: The ambient air temperature is around 17°C-30°C. The environment has a humidity level of between 70% - 80%. Grows in the plains at an altitude of 700 - 1200 meters above sea level. The growing medium is like raised bed soil, which is sandy, fertile, loose and well-drained. pH 5.5 - 6.7 . Requires enough water, but cannot withstand direct exposure to rainwater, so it needs a greenhouse. In the vegetative phase (2-8 weeks), it requires the assistance of lighting by a 150 watt/9 m<sup>2</sup> incandescent lamp at 22.30-01.00 installed at a height of 1.5 m from the plant. At the start of root formation, humidity of 90-95% is required or when the plant is young. Meanwhile, when ready to harvest, chrysanthemum plants need 70-80% humidity.

#### 2. Choose the type of chrysanthemum flower

There are quite a lot of types of chrysanthemum flowers. You can adjust this to your wishes. The following are several types of chrysanthemum flowers that you can choose:

##### a. Types of Cut Chrysanthemums

##### 1. White Chrysanthemum Flowers

There are 2 types of white chrysanthemums, namely Inodorum and Maximum, both of which have a white base color with yellow at the core.

##### 2. Yellow Chrysanthemum Flowers

yellow chrysanthemum flower. As the name suggests, this chrysanthemum has a bright yellow color but is a little dark at the core.

### 3. Purple Chrysanthemum

The purple chrysanthemum type is one of the types that is widely cultivated because it can give a calming impression to the owner.

### 4. Red Chrysanthemum Flowers

Red chrysanthemum flower, This type of red chrysanthemum plant has the characteristics of growing bushy and requiring full sunlight.

### 5. Rainbow Chrysanthemum Flowers

As the name suggests, rainbow chrysanthemums have various colors ranging from red, yellow, white, pink to orange.

### 6. Chrysanthemum Aster

Aster chrysanthemums. Aster chrysanthemums are characterized by their small flowers but there are many of them, this type is also in great demand because of its mini size.

## **b. Types of Chrysanthemum Flowers in Potted Plants**

This type is generally grown for home use and uses potting media. Potted chrysanthemums are usually used to beautify a room. There are several types of potted chrysanthemums, namely:

### 1. Pompom Chrysanthemum Flowers

Pom pom chrysanthemum flowers. This flower with a unique name has layered petals that form a ball that can reach 10 cm.

### 2. Chrysanthemum Daisy

Chrysanthemum daisy The daisy chrysanthemum at the center has one row of petals resembling a daisy.

### 3. Chrysanthemum Anemone Flowers

Anemone chrysanthemums have a round shape resulting from a combination of single and double chrysanthemums so they have their own uniqueness.

### 4. Spider Chrysanthemum

As the name suggests, the shape of the petals resembles spider legs, which is why it is called that.

## **3. Choosing Chrysanthemum Flower Seeds**

The nursery method for planting chrysanthemums can be done in 3 ways, namely by seeding through seedlings, shoot cuttings and through tissue culture. For more details, here is the explanation:

### **a. Seedlings Through Tillers**

Nursery chrysanthemum seedlings. Through the saplings that grow around mature chrysanthemums, you can use them as seeds.

The method is also quite easy, you only need to remove the sapling, then replant it in the desired place such as a pot or planting area. Seeding through seedlings is very effective for development, considering that chrysanthemums can produce more than one seedling. Apart from that, seeding through seedlings is also relatively easy because the seedlings can grow and develop quickly compared to seeding through other methods. Seeding through seedlings is very common among potted chrysanthemum flower cultivators or ornamental flower lovers.

### **b. Seedlings Through Shoot Cuttings**

Shoot cutting chrysanthemum breeder. Seeding chrysanthemums through shoot cuttings is usually done because it does not require a long time to wait for the growth of seedlings from adult chrysanthemums. Thus, shoot cuttings are commonly carried out by chrysanthemum cultivators in large numbers. The following is how to determine which plants can be cut from shoots: Determine mature chrysanthemum plants that are healthy, free of pests and diseases and are old enough. Select the shoots of chrysanthemum plants that are bright green in color, have a base diameter of 3-5 mm, a length of 5 cm, and have at least 3 leaves. Cut the shoots, then immediately sow them in the prepared seedbed location. If you want to store it, you can store the cut shoots in a cool room with an air temperature of 40 C, with a humidity of 30% so that they remain fresh. With this way. Storage can be done for 3-4 weeks.

The way to store shoot cuttings is to wrap the cut shoots in several layers of tissue paper, then put them in a plastic bag. In one bag, you can fill at least 50 cuttings.

### **c. Seedlings With Tissue Culture**

Tissue culture chrysanthemum breeding . Seeding through tissue culture can be done in the following way: Determine the bud eye. Sterilization of buds with 0.04% HgCL sublimate for 10 minutes. Rinse the bud buds with sterile distilled water. Plant into solid MS medium which has been added with coconut water, NAA and BAP according to the dosage. Once the seedlings grow more than 7.5 cm and have at least 5 leaves, move them to the growing medium. Water 2-3 times a day using a sprayer tank filled with water.

## **4. How to Plant Chrysanthemum Seeds**

The 3 stages of planting chrysanthemums that you can apply are as follows: Plant chrysanthemum seeds vertically using your hands directly at the same height. Before planting, chrysanthemum flower seeds should be selected and the seeds must be selected first, make sure the seeds have the same height, namely no more than 5 cm. After planting, create a fogging effect using a power sprayer within 30 minutes. Apart from watering, this also functions to maintain the air humidity level so that it remains in accordance with the needs of young chrysanthemums, namely 90-95%.

## **5. How to Care for Chrysanthemum Flowers**

How to care for chrysanthemums. The care stage is the most crucial stage, because good care greatly influences the growth and development of the plant, so that it can produce flowers as expected. Therefore, pay attention to several important factors in the following stages of treatment:

### **a. Watering Time**

Watering is done using sufficient water and don't overdo it. Because, this can cause the roots of the plant to rot so that its growth is stunted or even dies. When the plants are young, water them at least twice a day with sufficient amounts. Meanwhile, when the plants start to mature, water them once a day in the morning so that the soil can absorb water quickly and can dry out during the day. Avoid watering in the afternoon and evening because it can cause disease

in adult chrysanthemums. This is because watering in the afternoon and evening can increase soil moisture and is very prone to attracting fungal diseases.

#### b. Pinching Technique

You also have to know the pinching technique, which means cutting/removing the tops of plants that grow at the beginning of planting. The goal is so that the leaves and stems that grow afterwards can be better and healthier. Just cut off a small portion of the shoot, namely around the chrysanthemum flower bud or part of the stem that has leaves and flower buds. Do this technique in the dry season and only once a week.

#### c. Disbudding Technique

Apart from the pinching technique, the disbudding technique is also done by cutting a small part of the plant. Even though they are almost the same, the purpose of this disbudding is so that the plants can grow as expected. You can use tools such as a cutter/scissors to cut it, but make sure you do it carefully so as not to damage the plant.

By disbudding, it is hoped that the plants can grow and develop well.

#### d. Sunlight Requirements

Chrysanthemum flowers also need sufficient sunlight to carry out photosynthesis properly. However, lighting that is too hot and excessive will actually make the flowers wilt and dry. For flowering, chrysanthemums need longer light. Therefore, it is recommended that you provide additional light from incandescent lamps. Provide additional lighting from 22.30-01.00 with 150 watt/9 m<sup>2</sup> lamps. Install the lamp at a height of 1.5 m from the ground. Provide additional light from the lamp at 2-8 weeks of age to help the plant photosynthesis process faster.

### **6. Fertilizing Chrysanthemum Flowers**

Fertilization is the key to successful cultivation of chrysanthemums. It is highly recommended to carry out the correct fertilization dose and use organic fertilizer.

The following are the advantages of using organic fertilizer:

1. Fertilizing using organic fertilizer can help chrysanthemum plants be stronger from pest and disease attacks. Flowers are brighter, more fertile, and cut flowers are stronger/longer lasting. It is highly recommended to use organic products that can meet all the nutritional needs of chrysanthemum plants.
2. This is because organic products contain macro and micro nutrients, good bacteria and enzymes which are very beneficial for plant growth and development.
3. The recommended range of organic products for chrysanthemum plants is Ornamental Plant Specialist Liquid Organic Fertilizer, Black BOS and SaMe Organic Bio Granules.

a. Basic Fertilization

Tilling the soil for chrysanthemum plants, both potted and cut chrysanthemums, is the initial determinant of the success of cultivating chrysanthemums. Therefore, you are advised to fertilize properly when cultivating the soil. One of our partners has proven the use of GDM Black Bos, here is the review:

Here's how to fertilize when cultivating the land:

1. After the soil has been hoed/plowed, and bunds/beds have been made, the next step is to carry out basic fertilization 14 days before planting.
2. Spread the GDM SaMe Organic Bio Granules evenly over the bunds/beds at a dose of 150 kg/ hectare. Dissolve 1 glass of GDM Black BOS mineral water into the spray tank, then spray it over the entire surface of the moist soil (having been doused with water beforehand). Do this until you reach a dose of 5 kg/ hectare.

b. Seeding and Fertilization 1, 2, 3, and 5

1. Fertilize during seeding at 7 Days after planting. Then the second and subsequent fertilizations are calculated every 7 days until the harvest time approaches.
2. Dissolve 500 ml (2 glasses of mineral water) GDM Ornamental Plant Specialist Liquid Organic Fertilizer into a spray tank filled with water. Spray all parts of the plant until you reach a dose of 8 liters/ hectare. Repeat application once every 1 week.

c. Fertilization Age 30 Days after plantin

1. The 4th fertilization is carried out around 30 Days after planting.
2. Sprinkle GDM SaMe Organic Bio Granules evenly around the plant roots. Do this until you reach a dose of 150 kg/ hectare. Dissolve 1 glass of GDM Black BOS mineral water into the spray tank, then spray it over the entire surface of the moist soil (having been doused with water beforehand). Do this until you reach a dose of 5 kg/ hectare.

So, that's how to fertilize chrysanthemum plants so they flower quickly. Of course, using the GDM Organic product range is the key to getting high quality and abundant chrysanthemum harvests. There is no need to add other fertilizers, because organic products can meet the nutritional needs of plants, including: The bacteria and enzymes contained therein have been proven to be able to improve soil conditions so that the soil becomes fertile again. The bacteria are very useful for creating growth hormones and fertilizing the soil. Accelerates plant growth and development. Increase flowering, and improve the quality of flowers so they look brighter and more attractive.

## 7. Pest Control

In order for plants to grow well, pest control must be carried out regularly. Types of pests such as caterpillars, aphids, thrips and white rust commonly attack chrysanthemum plants. The following are several types of pests that often attack when planting chrysanthemums along with their symptoms and control:

### 1) Earthworm (*Agrotis ipsilon*)

Symptoms of attack: drooping shoots and stalks because earthworms eat and cut the stem tips of young plants. Control: carry out conventional control by searching for and collecting caterpillars at dusk. Once collected, throw/burn the caterpillars in a place far from the land.

### 2) Thrips (*Thrips tabacci*)

Symptoms of attack: shoots, leaves and young shoots change color to yellow or silvery. This is because thrips suck nutrients from plants. Control: Set traps in the form of sheets of yellow paper containing adhesive, or you can also set traps from used bottles that are painted yellow, then given strong adhesive. This is commonly referred to as the yellow trap.

### 3) Red mite (*Tetranychus* sp)

Symptoms: due to the suction of red mites, the infected chrysanthemum leaves change color to brownish yellow as if they are drying out. In addition, the leaves appear twisted and thickened. Control: if it has been attacked with a heavy level of attack, it is recommended to remove and then burn the affected plants in a safe place and far from the land. However, if it is not serious, you can cut the affected plant parts, then burn them. By knowing several things for caring for chrysanthemum plants, you will definitely understand the attack of rust disease on chrysanthemum flowers.

The following is information about rust disease: Harvest Chrysanthemum Flowers. When you plant chrysanthemums and take care of them optimally, the results you get will also be maximum. In the harvest process itself, you must pay attention to the following 2 things, namely:

#### a. Chrysanthemum Harvest Time

Once the chrysanthemum flowers are 8 - 12 weeks old after planting, the flowers can be harvested. However, this time is relative because it can be different for different varieties and seasons.

#### b. Techniques for Harvesting Chrysanthemum Flowers

The following are the stages regarding the process of harvesting chrysanthemum In figure 1 you can see post-harvest activities and measurements of flower quality



Figure 1. shows post-harvest activities and flower quality measurements

If we only want the flowers, then harvesting is done when the flowers are still half-bloomed, namely at the age of 3 - 4 days. Harvesting is done by cutting the flower stalks when they reach 60 - 80 cm. Also make sure that the scissors used are sterile from disease germs, this is because contaminated scissors can cause healthy plants to become infected with disease. Once collected, immediately spray it with water to preserve it, then wrap it in the packaging you usually use for shipping. The community service activities that we carry out can be seen in Figure 2.



**Figure 2. Community service activities**

## **CONCLUSIONS AND RECOMMENDATIONS**

1. Increasing the added value of chrysanthemum plants and farmers can be done by improving and upgrading good and correct seed technology
2. Management of pests and diseases of chrysanthemum plants carried out organically can increase plant production
3. Seeding and propagation of chrysanthemum plants must be done well so that the development of chrysanthemum plants can actually be realized to increase the added value of chrysanthemum plants and farmers
4. Controlling pests and diseases of chrysanthemum plants needs to be done in an environmentally friendly manner so that the plants are always healthy and the environment is maintained

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