GROWTH AND RESULTS RESPONSE OF ONION ON THE APPLICATION DOSAGE OF THE BIOCOMPOST Trichoderma spp. AND ARBUSCULAR MYCORRHIZAL FUNGI

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Abstract

One of the obstacles in the cultivation of onion is low soil fertility, limited water availability, and high soil temperature. In addition, cation exchange rates and P available which are low due to high soil fixation. One way to overcome this obstacles is the use of biocompost Trichoderma spp. and Arbuscular Mycorrhizal Fungi (AMF). This study aimed to determine the growth and yield response of onion that were applied dosage with biocompost Trichoderma spp. and AMF. This research was carried out in a field condition in Senteluk Village, Batu Layar Sub-District, West Lombok Regency, NTB, starting from June to October 2018 using Split Plot Design. As the main plot is a biocompost dosage consisting of five levels, namely: 0 g/plant, 5 g/plant, 10 g/plant and 15 g/plant and 20 g/plant. As subplots, AMF dosage consist of 5 levels, namely: 0 g/plant, 5 g/plant, 10 g/plant, 15 g/plant and 20 g/plant. The treatment is a combination of biocompost dosages and AMF dosage repeated 3 times to obtain 75 experimental units. The results showed that onion plants responded well to the application dosage of Trichoderma spp. starting from 5 g/plant to 20 g/plant as indicated by higher growth and yield compared to the control. The same was shown in the application of AMF dosage ranging from 5 g/plant to 20 g/plant showing growth and yield of onion higher than the control.
Keywords: Onion, biocompost, Trichoderma spp., Arbuscular Mycorrhizal Fungi (AMF), dosage.

1. Introduction

Consumption of onions in general tends to increase from year to year. In the last two years, 2014-2015, red onion consumption per capita has increased from 2.49 kg to 2.71 kg, which means an increase in the amount of consumption by 8.84%. This shows that the demand for onions will continue to increase in the future (Based on Ministry of Agriculture, 2016).

The high public consumption of onions has not been accompanied by adequate production so that domestic demand is still met with imports. In the last four years, in 2012-2015 imports of onions were still high, reaching 122,190 tons, 96,139 tons, 74,019 tons and 17,429 tons (Ministry of Agriculture, 2016).

West Nusa Tenggara (NTB) is one of the centers of onion production in Indonesia. Red onion production in NTB from 2012-2014 has increased, referring to the 2015 Central Bureau of Statistics (BPS) data, which is 2012 red onion production of 100,990 tons with a land area of 12,333 ha, in 2013 amounting to 101,628 tons with a land area of 9,277 and year 2014 amounted to 117,513 tons with a land area of 11,518 ha. However, it can be seen from the productivity of onions, which are still relatively low, namely an average of 5.0 tons / ha compared to national productivity which reaches 9.54 tons / ha (BPS, 2012).

Some obstacles to the low yield of onions include low soil fertility, limited water availability, and high soil temperature. In addition, there are other obstacles that often arise on this land are soil pH, cation exchange rate, and base saturation (KB) and low available P due to high soil fixation (Ismail and Effendi, 1981; Soepardi, 1983 ; Aljabriet et al., 1986; Adhiet et al., 1990; and Hilman, 1997 in Gunadi and Subhan 2007).

Thus, it is necessary to find integrated alternatives to increase the productivity of onions by applying onion cultivation through biological technology or commensurate technology such as the use of biocompost, biocompost, the use of Abuscular Mycorrhizal Fungi (AMF).

With the various limitations of the dry land, efforts are needed to overcome this so that it can be used as an onion production area. The intended effort must have a long-term impact
to support sustainable agriculture. One effort that can be done is to fix the condition of the soil by utilizing biocompost which is fermented with *Trichoderma* spp. and AMF.

According to Schalau (2002), mycorrhiza based on the method obtained is divided into two, namely Mikofer and Indigenus. Mikofer is mycorrhizal which is associated with plant roots with human intervention, while mycorrhizal which is found to be associated with plant roots naturally and without human intervention in the initial infection process between mycorrhizal and host plants is called indigenous mycorrhiza. According to Sudantha (2010), biocompost*Trichoderma* spp. is an activator material containing *Trichoderma* spp. which can be formulated in the form of liquid, tablets, and granules which play a role in spurring growth and flowering in plants.

The ability of indigenous mycorrhizae to increase crop production has also been reported by Astiko (2015), that indigenous mycorrhiza plus manure using soil samples from dry land in North Lombok were able to increase soybean yield (dry weight per plant) by 41%. While for biocompos, Sudantha and Abadi (2011) reported that the use of *T. harzianum* biocompost isolates Sapro-07 and *T. koningii* isolates Endo-02 can stimulate the growth and flowering of corn plants in greenhouse experiments. Furthermore Nubuwwah (2015), reported that biocompost*Trichoderma* spp. gave significant results to the weight of fresh tubers and dried onion stored tubers in greenhouse experiments, namely at 5 gram / pot biocompost dose or equivalent to 1.25 tons / ha.

Based on some of the above descriptions about the ability of mycorrhizal and biocompost*Trichoderma* spp. in increasing plant growth and improving soil aggregation, this is also expected to contribute to the increase in onion crop production, especially in local varieties on dry land. In addition, the consideration in this study is that there is no study of doses (AMF and biocompost*Trichoderma* spp.) Needed to increase the growth and yield of local onions on dry land. Therefore, research needs to be done to knowing the growth response and yield of onions that were applied with biocompost*Trichoderma* spp. and AMF.

2. **Materials and Method**

This research was carried out in field conditions in Senteluk Village, BatuLayar Sub-District, West Lombok Regency, NTB from June to October 2018 using Split Plot Design. As the main plot is a biocompost dosage consisting of five levels, namely: 0 g / plant, 5 g / plant, 10 g / plant and 15 g / plant and 20 g / plant. As subplots AMF doses consist of 5 levels,
namely: 0 g / plant, 5 g / plant, 10 g / plant, 15 g / plant and 20 g / plant. The treatment is a combination of biocompost dosages and AMF doses repeated 3 times to obtain 75 experimental units.

Biocompost *Trichoderma* is prepared in the form of a tablet formulation. The tablet formulation is based on Sudantha (2010) method using coffee leaf litter and clay. Coffee leaves are first dried and smoothed (littered) with a blender then sifted and weighed as much as 250 grams, while the clay is dried then weighed 750 grams, then the coffee leaf litter and clay are sterilized by autoclave. Coffee leaf litter mixed with sterile clay with a ratio of 1:3 (v/v). The mixture was then inoculated with *Trichoderma* suspension (*T. koningii* and *T. harzianum*) with a density of 107 / ml suspension. After everything was mixed thoroughly then put into a tablet maker (one tablet with a diameter of 2.0 cm and weighing 5.0 g) and incubated at room temperature for two weeks.

AMF used is local mycorrhizae of *Glomus* sp. MAA01 isolate. Indigenusmycorrhizal inoculant MAA01 isolate is a mixture of soil, roots, *Glomus* sp. Spores, indigenous mycorrhiza hyphae resulting from cultur multiplication of pots with corn host plants after being maintained for 3 months. After 3 months the plants and soil are dismantled and then dried and then blended and filtered with a filter eye of 50 mash, so that the final form of inoculant is in the form of flour.

Application of biocompost *Trichoderma*Spp. and AMF done during planting. Application of *Trichoderma*Biocompost done before the seed onions in with a number of doses that have been determined, while the application of inoculants during planting. Inoculants are placed in the soil at a depth of ± 10 cm evenly forming a layer after which the seeds of shallots are placed on top of it then covered with soil.

Growth variables observed included: plant height, number of leaves, number of tillers per clump, wet weighted weight, dry weighted weight, fresh tuber weight, and dry tuber weight. The data were analyzed by Analysis of Variance at the 5% level using the Minitab Version 16. Program. Furthermore, the treatments that showed significant differences were tested by the Honestly Significant Difference test (HSD) at the same level.

3. **Results And Discussion**

3.1 **Onion Plant Response to Biocompost *Trichoderma* Spp.**
3.1.1 Plant height

The results of the analysis of variance showed that the biocompost dose was significantly different from the onion plant height at 7 to 35 days after planting. The average height of onion due to the application of biocompost doses is presented in Table 1.

Table 1. Average height of onion plants in each treatment of biocompost *Trichoderma* spp at age 7 to 35 days after planting (DAP)

<table>
<thead>
<tr>
<th>Biocompost dosage (g/plants)</th>
<th>Height plants (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7 DAP</td>
</tr>
<tr>
<td>0</td>
<td>11.45 a*)</td>
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<tr>
<td>5</td>
<td>13.00 b</td>
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<tr>
<td>10</td>
<td>13.19 b</td>
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<tr>
<td>15</td>
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<tr>
<td>20</td>
<td>13.64 b</td>
</tr>
</tbody>
</table>

*) The numbers followed by the same letters in the same column are not significantly different from the BNJ 5% test.

Based on Table 1 shows that the treatment of biocompost *Trichoderma* spp has a significant effect on increasing plant height. This can be seen in the height of onion plants given biocompost *Trichoderma* spp tend higher than the treatment without biocompost (control). The effect of the best biocompost *Trichoderma* spp treatment on increasing the height of onions starting from 7 days to 35 days is a dose of 20 g / plant (41.00 cm), while the lowest onion plant height is a dose of 0 g / *Trichoderma* spp biocompost (control) (39.16 cm).

The increase in plant height in plants inoculated with biocompost *Trichoderma* spp is thought to be due to an increase in hormones caused by the fungal activity of *Trichoderma* spp. As Triyatno (2005) reported that *Trichoderma harzianum* inoculated in ginger plants was able to increase the height of ginger plants by 16.77%. Furthermore Wirastaningjati (2006), reported that *Trichoderma* spp fungi from banana rhizosphere which was inoculated two weeks before planting were able to increase plant height to a difference of 46.74 cm.
Sudantha (2011) says that Trichoderma spp. removing hormones that can be diffused into plant tissues which can spur plant growth. This is confirmed by the study of Ramadhani (2007) which states that Trichoderma spp. produce growth hormone in the form of auxin with IAA levels 9,656 µM. The same thing has been proven in the results of the research by Wirastaningiati (2006) that Trichoderma sp. from the rhizosphere bananas are reported to have been able to increase growth so that the plant height difference reached 46.74 cm in the treatment of Trichoderma spp. isolates. Latifah et al., (2011) also stated that T. harzianum can increase plant growth, increase absorption active minerals, and other nutrients from the soil. Sudantha (2010) conducted an experiment on soybean plants that biocompost was fermented with Trichoderma spp. role can increase seed germination, increase vegetative and generative growth of plants. Likewise on shallots conducted by Sudantha and Suwardji (2016) suggest that biocompost accompanied by the administration of Trichoderma spp. can increase the yield of onion.

3.1.2 Number of Leaves

The results of the analysis of variance showed that the application of Trichoderma biocompost doses showed significant differences in the number of onion at ages 7 to 35 days after planting. The average number of leaves due to the use of Trichoderma biocompost doses is presented in Table 2.

<table>
<thead>
<tr>
<th>Biocompost dosage (g/plant)</th>
<th>Number of leaves (sheet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7 DAP</td>
</tr>
<tr>
<td>0</td>
<td>14.17 a</td>
</tr>
<tr>
<td>5</td>
<td>15.36 b</td>
</tr>
<tr>
<td>10</td>
<td>15.57 b</td>
</tr>
<tr>
<td>15</td>
<td>15.70 b</td>
</tr>
<tr>
<td>20</td>
<td>15.97 b</td>
</tr>
</tbody>
</table>
*) The numbers followed by the same letters in the same column are not significantly different from the BNJ 5% test.

Based on Table 2 shows that the treatment of biocompost *Trichoderma* spp. has a significant effect on the number of onion plant leaves. This can be seen in the number of leaves of onions given biocompost *Trichoderma* spp. at the age of 7 days to 35 days tend to be higher than the treatment without biocompost *Trichoderma* spp. (control). The highest number of leaves at the age of 7 days to 35 days is the dose of 20 g/plant while the dose with the lowest number of leaves is the dose of 0 g/plant biocompost.

Plants given *Trichoderma* spp. able to increase the number of leaves in plants because *Trichoderma* spp. can produce growth hormones such as auxin which can stimulate leaf growth. This is supported by Sudantha and Abadi (2006), that the presence of *Trichoderma* spp. can stimulate the formation of leaf shoots / tendrils. The presence of *Trichoderma* in both plant tissue and population in the soil is very influential on plant growth. Based on the calculation of the average population of *Trichoderma* in soil is $16.67 \times 10^{-3}$ propagul/g soil (without *Trichoderma* application), $30.00 \times 10^{-3}$ propagul/g soil (*Trichoderma* application).

Table 3. Average number of tillers, weight of wet tubes, weight of dry bulbs, onion plants in each treatment of biocompost *Trichoderma* spp.

<table>
<thead>
<tr>
<th>Biocompost dosage (g/plant)</th>
<th>Number of tillers/clump</th>
<th>Weight of Wet Tubes (kg/plot)</th>
<th>Weight of dry bulbs (kg/plot)</th>
<th>Weight of dry bulbs (kg/plot)</th>
<th>Dry weight (kg/plot)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>8.64 a</td>
<td>6.39 a</td>
<td>5.77 a</td>
<td>8.09 a</td>
<td>6.93 a*</td>
</tr>
<tr>
<td>5</td>
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<td>7.31 b</td>
<td>9.36 b</td>
<td>8.32 b</td>
</tr>
<tr>
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<td>9.60 b</td>
<td>8.05 b</td>
<td>7.57 b</td>
<td>9.57 b</td>
<td>8.58 b</td>
</tr>
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<td>15</td>
<td>9.66 b</td>
<td>8.31 b</td>
<td>7.83 b</td>
<td>9.81 b</td>
<td>8.82 b</td>
</tr>
<tr>
<td>20</td>
<td>9.77 b</td>
<td>8.59 b</td>
<td>8.09 b</td>
<td>10.05 b</td>
<td>9.08 b</td>
</tr>
</tbody>
</table>

*) The numbers followed by the same letters in the same column are not significantly different from the BNJ 5% test.
Based on Table 3 shows that the treatment of biocompost *Trichoderma* spp. has a significant effect on the number of tillers, the weight of wet bulbs, dry tubers, wet and dry stover onion plants. This can be seen in the number of tillers, the weight of wet tubers, dry tubers, wet streaks and dried dried onions given biocompost *Trichoderma* spp. tend higher than the treatment of 0 g / indigenous mycorrhizal plants (controls). The original mycorrhizal dose which gave the highest value on all variables was the dose of 20 g / plant, namely the number of tillers (9.77 / clump), weight of wet tuber (8.59 kg / plot), dry tuber (8.09 kg / plot), wet cage (10.05 kg / plot) and dry cage (9.08 kg / plot).

The presence of *Trichoderma* spp. on plant tissue has an important role in increasing weight weight, because *Trichoderma* is able to stimulate plants to produce growth hormones. As Roco and Perez (2001), stated that *Trichoderma harzianum* fungus can stimulate plants to produce certain hormones such as gibberellic acid (GA3), indolacetic acid (IAA), and benzylaminopurin (BAP) in large quantities. Gibberellins and auxin hormones in plants play a role in lengthening the roots and stems, stimulating flowering and fruit growth and increasing plant growth.

Based on the above data the highest yield of fresh bulbs onion KetaMonca varieties the effect of *Arbuscular Mycorrhizal Fungi* (AMF) application was 15.2 tons / ha (dose of 20 g / AMF) and the lowest yield was 9.8 tons / ha (dose 0 g / AMF), while the highest yield of fresh bulbs of onion variety KetaMonca influences the application of biocompost *Trichoderma* spp. amounting to 14.32 tons / ha (dose of 20 g / biocompost *Trichoderma* spp.) and the lowest yield of 10.65 tons / ha (dose of 0 g / biocompost *Trichoderma* spp.). In the highest yield of dried tubers, varieties of KetaMonca variety, the effect of AMF application was 14.44 tons / ha (dose of 20 g / AMF and the lowest yield was 8.78 tons / ha (dose 0 g / AMF, the highest yield of dried onion varieties of KetaMonca variety influence

The application of biocompost *Trichoderma* spp. amounting to 13.48 tons / ha (dose of 20 g / plant biocompost *Trichoderma* spp.) and the lowest yield 9.62 (dose of 0 g / plant biocompost *Trichoderma* spp.). Based on Ministry of Agriculture (2003), the potential yield of KetaMonca varieties of onion tuber per hectare is 10.7 tons / ha, thus the application of indigenous mycorrhizal fertilizers and *Trichoderma* spp. independently still able to increase the yield of KetaMonca variety onion bulbs on dry land.
3.2 Onion Plant Response to *Arbuscular Mycorrhizal Fungi* (AMF) Doses

3.2.1 Plant height

The results of the analysis of the diversity of AMF doses on onion plants at the ages of 7 to 35 days after planting showed significant differences. The average plant height due to the effect of AMF doses is presented in Table 4.

Table 4. Average height of onion Plants at each treatment of AMF dosage at age 7 hst to 35 days after planting (DAP)

<table>
<thead>
<tr>
<th>AMF dosage (g/plant)</th>
<th>Plant height (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7 DAP</td>
</tr>
<tr>
<td>0</td>
<td>11.15 a</td>
</tr>
<tr>
<td>5</td>
<td>12.83 b</td>
</tr>
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<td>13.52 b</td>
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<td>14.26 b</td>
</tr>
<tr>
<td>20</td>
<td>14.30 b</td>
</tr>
</tbody>
</table>

*) The numbers followed by the same letters in the same column are not significantly different from the BNJ 5% test.

Based on Table 4 shows that the treatment of AMF dosage has a significant effect on plant height. This can be seen in the height of onion plants given AMF tend mycorrhizae higher than those without AMF (controls). An AMF treatment dose of 20 g / plant has the best influence on increasing the height of onion plants from the age of 7 to 35 days. Meanwhile, the lowest onion plant height was at the dose of 0 g / AMF (control). The increase in plant height in onions is caused by AMF infections in the roots of plants. As the results of observations and calculations, the average degree of root infection in onions applied with AMF was higher (57%) than without the application of AMF (33%). Mayerni and Hervani (2008), suggest that plants with mycorrhiza have higher plant height growth because the absorption of nutrients needed by plants runs more effectively so that metabolism of plant growth can take place well, especially in the vegetarian phase towards the generative phase.
This is also supported by the opinion of Sastrahidayat (2011) who suggested that upland rice plants inoculated with *Glomusmosseae* had better plant growth than control. In addition, chili plants inoculated with Glomusmosseae can increase plant height and stem diameter better than the control.

Increased growth of plants that have mycorrhiza is caused by increased physiological activities of plants to extract nutrients in the soil such as K, Ca, Mg, and P. The main uptake of nutrients by mycorrhiza is the nutrient of Phosphorus. In addition, mycorrhiza is also thought to increase growth hormone in plants (Carling and Brown, 1982). Furthermore Paul and Clark (1989) say that although the mechanism is difficult to know, hormone activity and photosynthesis will increase in plants associated with mycorrhizae. Yusrinawati, Sudantha and Astiko (2017) say that the application of AMF accompanied by bioactivators can increase the growth and yield of onion on dry land. Sahiran and Sudantha (2018) say that the application of AMF can increase phosphorus uptake so that it can increase corn yield on dry land. Yudhiarti, Sudantha and Fauzi (2017) revealed that the application of AMF and bioactivator *Trichoderma* spp. can increase soybean growth and yield on dry land. Sudantha, Fauzi and Suwardji (2016) said that the application of AMF and bioactivator *Trichoderma* spp. in addition to increasing growth and red bawanmg results can also increase induced resistance to Fusarium wilt. Sudantha and Suwardji (2012) say that the application of bioactivators and biocompost containing *Trichoderma* spp. and AMF can improve the health, growth and yield of soybean crops in dry land.

### 3.2.2 Number of Leaves

The results of the analysis of the diversity of AMF doses on the number of onion at the age of 7 to 35 days after planting showed significant differences. The average number of leaf plants due to the effect of AMF doses is shown in Table 5.

Table 5. Average amount of onion plant leaves in every original mycorrhizal dosage treatment at age 7 to 35 days after planting (DAP)

<table>
<thead>
<tr>
<th>AMF Dosage (g/plant)</th>
<th>Number of Leaves (sheet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7 DAP</td>
</tr>
</tbody>
</table>

107 | P a g e
Based on Table 5 shows that the treatment of AMF dosage has a significant effect on the number of leaves of onion plants. This can be seen in the number of onion plant leaves given indigenous mycorrhizae at the age of 7 days to 35 days higher than the treatment without AMF (control). The highest number of leaves at the age of 7 to 35 days is a dose of 20 g / plant while the dose with the lowest number of leaves is the dose of 0 g / AMF.

Increasing the number of leaves on onions given AMF is thought to be due to an increase in the availability of N nutrients in the soil by AMF. This is supported by the results of N-Total soil analysis of 0.17% without indigenous mycorrhizal administration, while N-Total soil after administration of indigenous mycorrhiza is 0.28% greater than 0.11% compared to controls (Appendix 2). This fact is also supported by Hapsoh (2003) who reported that besides indigenous P mycorrhizal nutrients, it can also absorb other nutrients such as car N. Furthermore, Sastrahidayat (2011) suggested that plants given mycorrhizae had a significant effect on increasing the number of leaves compared to plants without administration of mycorrhiza.

Wijaya (2008) reports that sufficient N supply can expand leaf strands and increase the amount of chlorophyll in leaves so that plants can produce sufficient amounts of carbohydrate / assimilate for their growth. Furthermore, Sarief (1986) suggested that nutrient N is needed by plants in the formation and growth of vegetative parts of plants such as roots, stems and leaves.

### 3.3 Yields

The results of the analysis of variance of AMF doses on the number of onion, wet weight, dry weight, wet tuber weight and dry tuber weight showed significant differences.
The average number of onion, wet weight, dry weight, wet tuber weight and dry tuber weight due to the effect of AMF doses are presented in Table 6.

Table 6. Average number of puppies, weight of wet bulbs, weight of dry bulbs, onion plants at each indigenous mycorrhizal dosage at age 7 to 35 days.

<table>
<thead>
<tr>
<th>AMF Dosage (g/plant)</th>
<th>Number of tillers/ clump</th>
<th>Weight of Wet Tubes (kg/plot)</th>
<th>Weight of dry bulbs (kg/plot)</th>
<th>Weight of dry bulbs (kg/plot)</th>
<th>Dry weight (kg/plot)</th>
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<td>8.70 b</td>
<td>10.65 b</td>
<td>9.65 b</td>
</tr>
</tbody>
</table>

*) The numbers followed by the same letters in the same column are not significantly different from the BNJ 5% test.

Based on Table 6 shows that the treatment of AMF has a significant influence on the number of tillers, the weight of wet tubers, dry tubers, wet and dry stover onion plants. This can be seen in the number of tillers, wet tuber weight, dry tubers, wet streaks and dry dried onion plants which are given higher tend native mycorrhiza compared to the treatment of 0 g / AMF (controls). The original mycorrhizal dose which gave the highest value on all variables was the dose of 20 g / plant, namely the number of tillers (10.12 / clump), weight of wet tuber (9.12 kg / plot), dry tuber (8.62 kg / plot), wet cage (10.60 kg / plot) and dry cage (9.62 kg / plot). This is in line with the opinion of Sastrahidayat (2011) that plants given mycorrhizae had a significant effect on the number of tillers and plant weights compared to plants without administration of mycorrhiza. Furthermore, based on Ministry of Agriculture (2003) the number of onion varieties of KetaMonca varieties was 3-6 tubers, while based on the above data the number of tillers applied with indigenous mycorrhizae was 9-10 tubers, thus the application of indigenous mycorrhiza although independently still able to increase the number of tillers KetaMonca variety onion.
Increasing tuber weight in plants given indigenous mycorrhiza is thought to be due to an increase in the amount of P nutrients in the soil available to plants. Based on the results of the analysis of soil samples, the number of available P in the treatment of indigenous mycorrhiza was 32.91 ppm greater than the treatment without indigenous mycorrhiza (control) which was 10.86 ppm. P nutrients are very important in the formation of generative parts of plants. As, Lingga (1989) suggests that nutrient P plays a role in the formation of flowers, fruits, seeds and roots, especially the roots of seeds and young plants.

The increase in wet and dry weighted on red onion plants is due to the good symbiosis between plants and mycorrhizae in absorbing nutrients. As Purba (2005) suggests that plant symbiosis with mycorrhizae has a very important role in increasing nutrient uptake of phosphorus, improving plant growth and yield. Drew (2003) also reported that the increase in plant weight can be caused by external hyphae activity of mycorrhizae which can absorb water in the soil pores when the plant roots are no longer able to absorb water. The diameter of external hyphae which is much smaller than the root diameter allows it to penetrate the micro pore of the soil to get water and nutrients that cannot be reached by the roots.

4. Conclusion

The results showed that onion plants responded well to the application dosage of Trichoderma spp. starting from 5 g/plant to 20 g/plant as indicated by higher growth and yield compared to the control. The same was shown in the application of AMF dosage ranging from 5 g/plant to 20 g/plant showing growth and yield of onion higher than the control.

Based on the results of analysis, discussion and conclusions obtained, it is advisable to conduct further research on the application of indigenousmycorrhizal doses and biocompostTrichoderma spp on several onion varieties to determine the growth response and results of several doses of indigenous mycorrhiza and biocompostTrichoderma spp on onion plants on dry land.

5. Acknowledgements

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6. Reference


Astiko, W., 2015. The Role of IndigenicMycorrhiza in Different Planting Patterns in Increasing Soybean Results in Sandy Soil (Case Study in North Lombok Dryland). Dissertation. Postgraduate Program in Brawijaya University, Malang.


Fusarium Stem Disease. *CROPAGRO Agricultural Cultivation Scientific Journal*, Department of Agriculture Cultivation, Faculty of Agriculture, University of Mataram, Mataram. 4 (2).


