Introduction. Somatic embryogenesis (SE) technology is a way to produce high quality clonal seedlings of cocoa plant which can support the mass seedlings production that feasible and achievable to the farmer. The SE technique will potentially provide seedlings that have better characteristics include canopy with perfect jockey, relatively uniform growth, vigorous plant, actively tolerance to drought, high yield (Dirkeowk 2003). Besides, this is a way to propagate cocoa populations. SE plantlets are found in the nursery during the acclimation period. Arborescular mycorrhizal fungi (AMF) is one of fungi types that have many advantages to plant and soil. Among important role of AMF are production of rhizosphere of infected plant that can assist the plant in nutritional absorption and increase plant tolerance to drought. Root bleeding of the infected plant to absorb nutrition from soil found to increase up to 30 times of the normal plant root system (Van, 1999). Based on the discussion above, a study was carried out to investigate and explore the growth response of somatic embryogenesis plantlet of cocoa to the application of arborescular mycorrhizal fungi (AMF) in different growth medium.

Materials and methods. The SE cocoa plantlets materials were obtained from Jember and the mycorrhizal fungi was from species of Acaulospora subtercularia produced by Bogor Agricultural Institute. The trial was conducted at Dusun Patene, Tempanah village, Maros district, Maros Regency during June 2016 until March 2017. The experiment consisted of two treatments factors: namely application of Arborescular Mycorrhizal Fungi (AMF) as the first factor consisted of four levels: control (no application), 20, 30 and 40 g mycorrhizal fungi growth medium of the second factor consisted of four different composition of 1:1.1, 1:1, 1.1:1 and 1.1:1 for soil, sand and compost, respectively.

Table 1. Average of increase in plant height of the Somatic embryogenesis seedlings with application of Arborescular Mycorrhizal Fungi (AMF) in different growth media

<table>
<thead>
<tr>
<th>AMF Dosage (g)</th>
<th>Growth Media Composition</th>
<th>Average (cm)</th>
<th>DMRT P = 0.05</th>
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<tbody>
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<td>1:1:1</td>
<td>3.00</td>
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Table 2. Average of increase in leaf number of the Somatic embryogenesis seedlings with application of Arborescular Mycorrhizal Fungi (AMF) in different growth media

<table>
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<tr>
<th>AMF Dosage (g)</th>
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<th>Average (Leaves)</th>
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Table 3. Leaf area index of the Somatic embryogenesis seedlings with application of Arborescular Mycorrhizal Fungi (AMF) in different growth media

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Table 4. Relative Growth Rate of the Somatic embryogenesis seedlings with application of Arborescular Mycorrhizal Fungi (AMF) in different growth media

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Conclusion. Use of Arborescular Mycorrhizal Fungi (AMF) can help to increase the growth of the cocoa seedlings resulted from somatic embryogenesis propagation technique at the nursery level. The utilization of somatic embryogenesis propagation can be used as an alternative to increase the cocoa seedlings growth at this stage. Proper combination of AMF dosage and growth medium composition had a significant effect on relative growth rate of the plant. Application of 20 g mycorrhizal fungi growth medium composition of 1:1.1 to 1:1, and better growth was shown by application of a mixture of 1:1.1:1 for soil, sand and compost. Relative growth medium composition had a significant effect on various growth parameter of the plant. Application of 20 g mycorrhizal fungi growth medium composition of 1:1.1 to 1:1, and better growth was shown by application of a mixture of 1:1.1:1 for soil, sand and compost. The effective result of AMF application on the growth parameters such as addition in plant height and leaves number. Better relative growth medium composition was shown by 20 g mycorrhizal fungi growth mixture composition of 1:1.1:1. Mycorrhiza dosage of 20 g mycorrhizal fungi gave better leaf area index of the plant compared to other treatments.

Acknowledgement. Great appreciation to Dr. Abdul Kadir Bungs MP, Director of Postgraduate Program of Islamic University of Makassar for assistance in obtaining the AMF inoculant.
Makassar, 15 Juni 2013

Letter of Acceptance for Presentation

Dear sir/madam,

We would like to inform you that an abstract written by Ifayanti et al. (Hasanuddin University, Makassar), entitled: “Growth somatic embryogenesis plantlet of cacao (Theobromae cacao L.) due to application of arbuscular mycorrhiza fungi (AMF) and growth media., is accepted by the committee as Poster Presentation on SISCO2013 in Makassar. Therefore, we invited you and please send the full article to the committee for proceedings of SISCO2013. Detailed schedule will be sent as soon as possible.

Thank you for your participation in this conference.

Yours Sincerely,

Dr. Ade Rosmana,
Chairperson
Growth of Somatic Embryogenesis Planlet of Cacao (Theobroma cacao L.) due to Application of Arbuscular Mycorrhiza Fungi (AMF) and Growth Media

Ifayanti Ridwan*, Salwiah and Badron Zakaria
Department of Agronomy, Faculty of Agriculture
Hasanuddin University, Makassar 90245 Indonesia

A study was carried out to investigate and explore the growth response of somatic embryogenesis planlet of cacao to the application of arbuscular mycorrhiza fungi (AMF) in different growth medium. The research was conducted at Dusun Pattene, TemmapadduaE village, Marusu district, Maros Regency during June 2010 until March 2011. The experiment was set up in Randomized Block Design (RBD) consisted of two factors namely application of Arbuscular Mycorrhiza Fungi (AMF) as the first factor consisted of four levels: control (no application), 20, 30 and 40 g/polybag and growth medium as the second factor consisted of four different composition of 1:1:0 (control), 1:1:1, 2:1:1 and 3:1:1 for soil, sand and compost, respectively. The result showed that interaction of the mycorrhiza application and the growth medium composition had a significant effect on various growth parameter of the planlet. Application of 20 g/polybag mycorrhiza in growth media composition of 2:1:1, related to mycorrhizal infection of 75%, gave better result on the growth parameters such as addition in plant height and leaves number. Better relative growth rate of the planlet was shown by plant treated with combination of 20 g/polybag mycorrhiza and growth mixture composition of 1:1:1. Mycorrhiza dosage of 20 g/polybag also gave better leaf area index of the planlet compared to other treatments.

Key words: Cacao planlet, somatic embryogenesis, Arbuscular Mycorrhiza Fungi (AMF), growth media