

TRADITIONAL CULTIVATION TECHNIQUES OF COCOA PLANTS AND THE UTILIZATION TURMERIC EXTRACT BECOME VEGETABLE PESTICIDES FOR MANAGING VASCULAR STREAK DIEBACK (VSD)

Abdillah Munawir¹, Donwil Panggabean², Bachtiar³,
Siti Umamah Naili Muna⁴, Edi Rusdiyanto⁵, Sri Dewi Nirmala⁶

Universitas Terbuka, Tangerang Selatan

^{1*} abdillahmunawir@ecampus.ut.ac.id, ² donwill@ecampus.ut.ac.id, ³ bachtiar_nur@ecampus.ut.ac.id,
⁴ naili@ecampus.ut.ac.id, ⁵ edi@ecampus.ut.ac.id, ⁶ nirmaladewi@ecampus.ut.ac.id

Abstract

The cocoa plant is the main ingredient in the manufacture of chocolate and its derivative products. The demand for cocoa derivative products is always high in line with the globalization of food and beverages made from chocolate. Traditional co-coa cultivation techniques are the main priority for farmers and the handling of Vascular Streak dieback (VSD) pests is a top priority for farmers. The purpose of this service is to improve the economy of cocoa farmers in Poli-Polia Village, Poli-Polia District, East Kolaka Regency. The method used is discussion, practice and demonstration material. The results of the shoot grafting technique for cacao seedlings and the manufacture of organic fertilizers increase the productivity of cocoa plants and the results of turmeric extract can directly deal with VSD diseases that attack cocoa plants. In practice, the method of processing and the efficacy of turmeric extract is the cause of not developing VSD disease in cocoa plants. On the other hand, cocoa yields can be sold at a high value based on training in harvesting techniques and how to improve the quality of cocoa beans.

Keywords: Handling VSD, Cocoa Plants, Traditional Cultivation Techniques.

INTRODUCTION

Indonesia was the third largest exporter in the world of cocoa beans with a production of 550,000 tons of dry beans after Ivory Coast (1,242,000 tons) and Ghana with a production of 662,000 tons (ICCO, 2011). In that year, around 1,555,596 ha or 94% of 1,651,539 ha Indonesian cocoa area was public (Ditjenbun, 2010). This indicates the important role of cocoa both as a job source and income for farmers. Indonesian cocoa area and production has also continued to increase rapidly in the last decade, at a rate of 5.99% per year (Ditjenbun, 2009).

The condition of cocoa plants in Southeast Sulawesi, especially in Kolaka Timur District, Poli-Polia District, is mostly over 20 years old. This has resulted in productivity of plant starting to decline. Beside that this condition is also aggravated by the high rate of pest and disease attacks which are also increasing and their handling is poor, especially in controlling pests and diseases as well as poor plantation practices.

Another problem experienced by cocoa farmers is the high incidence of pests and diseases, including Vascular Streak dieback (VSD) which is transmitted from one plant to

another through spores that are blown by the wind at midnight (Keane, 1981). The spores are very delicate and survive only a few hours in the early hours of the morning until the sun rises and the air becomes dry. This indicates that the fungus cannot spread far through spores usually only 10 to 20 meters, but if there is strong wind, the spores can be carried up to 182 m. VSD is less developed in the rainy season, and is spread only by hyphae in trees. Diagnosis of VSD in the garden can be carried out by looking at specific symptoms which yellowed leaves with green spots. The leaves are usually located in the second or third leaf series from the growing point. The yellowed leaves eventually fall so that the symptoms of toothless twigs appear. On the former seat of the leaf, there are 3 black-brown dots. When the twig is split longitudinally, brown lines are seen on the xylem tissue which leads to the former sitting leaves (Rubiyo and Siswanto, 2012). Thus, it is necessary to have training activity, practice, and demonstration of traditional cocoa cultivation technique, handling VSD, harvesting technique and drying and marketing of cocoa beans.

In addition, based on the results of the situation analysis, 70% of Poli-Polia Villages are cocoa producers. This service program is focused on empowering the economy of cocoa farmers in Poli-Polia Village by providing training to members of the Farmer Group on traditional cultivation technique, practice of organic fertilizer, vegetable pesticide, harvesting and drying technique and marketing of cocoa beans.

METHOD

The service method is Active and Participatory Learning (Nursyamsu, 2018). This method includes making discussion with farmers about the importance of traditional cultivation technique, the practice of shoot grafting, side grafting and the manufacture of organic fertilizer, the process of making vegetable pesticide from turmeric, harvesting and drying technique and how to market cocoa beans.

The object of the service activities is the Cocoa Farmers Group in Poli-Polia Village, Poli-Polia District, East Kolaka Regency. The targets are greater than 50 people.

The stages of this service activity consist of 4 stages, including: first, distributing invitations to all members of the farmer group containing information related to the theme, time, and place of the implementation of service activity. Second, delivering activity materials on traditional cultivation technique (side grafting and shoot grafting), the importance of the benefit of organic fertilizer around the house, the benefits of making botanical pesticide for handling cocoa plant disease, harvesting and drying technique and the importance of marketing cocoa beans. Third, practicing related to making organic fertilizer, grafting technique for cacao seedling, making vegetable pesticide from natural ingredients (kunyi) around the house, harvesting and drying technique for fruit seeds. Fourth, delivering material on the marketing of cocoa beans to various traders of cocoa beans.

Materials, Tools, and Practices

Top and Side Connecting Technique.

Material :

- Cocoa plant seeds, Entries MCC 02, Entries S2, transparent plastic, ribbon and neat rope.

Tools :

Scissors connect cocoa tops, knife, and cutter.

How to do the side connecting technique:

1. Choose the right tree for side grafting
2. Make a horizontal slice of 5 cm with a height of 60-100 cm from the ground, make sure the slice hits the wood
3. Cut the bark on a horizontal slice
4. Make 2 vertical incisions down a horizontal slice 2.5 cm wide and 5-7 cm long (for entry windows)
5. Open the incision/window slowly so that the cambium layer is not injured and looks white, if it is yellow it means the cambium is not good.
6. Cut the end of the stump at an angle of 70-75° and insert it into the window with the side of the incision attached to the cambium.
7. Tie the window with grafting plastic
8. Cover the joint with transparent plastic, then trim and tie the bottom of the plastic cover tightly.
9. One stem can be connected with 2-3 entres at a time, so that the success rate is higher.

How to do the grafting technique:

1. Choose a rootstock whose diameter is the same as the scion (entres);
2. Cut the rootstock as high as \pm 20-30 cm from the soil surface;
3. Cut the rootstock 2-2.5 cm long so that a gap is formed;
4. Entres that have been prepared are cut into leaves and slashed on both sides to become sharp
5. The scion is inserted in the slit of the rootstock
6. Cover it with an ice bag lid and tie it with neat rope string to keep moisture in
7. Place the plant in a shady and shaded place to avoid direct sunlight;
8. Seedlings are maintained until they are ready for planting in the garden for 3 – 6 months

Organic Fertilizer (Plants)

Materials :

- Gamal Leaf, Banana Stem, Rice Husk
- EM4
- Water

Tools :

- Machete (Counter Tool)
- Hoe
- Tarpaulin

How to make organic fertilizer:

1. Prepare gamal leaf, banana stem, rice husk and ready to be chopped in a prepared tarpaulin
2. Next, dissolve EM4 with a mixture of water in the organic matter. The solution is a decomposer solution, then tightly closed with a tarp and always stirred with organic matter every 2 days so that the composting process can be evenly distributed.
3. After 15-20 days organic fertilizer is ready to use

Vegetable Pesticide from Turmeric

Materials :

- Turmeric
- Solvent n-hexane

Tools :

- Measuring cup
- Filter

How to make vegetable Pesticide:

1. Puree or mash turmeric rhizome as much as 1 kg
2. Turmeric powder is dissolved/mixed with n-hexane solvent then left for 24 hours
3. Then the turmeric extract is filtered and the filtrate is taken
4. Then the solvent that is still mixed with the filtrate is evaporated to obtain a pure extract.
5. Furthermore, the purified extract filtered solution can be sprayed onto cocoa plants that are affected by *Vascular Streak dieback* (VSD) disease.

RESULT AND DISCUSSION

Community service activities to increase the productivity of cocoa plants with traditional cultivation technique of side grafting, shoot grafting, manufacture of organic fertilizer, manufacture of vegetable pesticide, harvesting and marketing technique as a form of economic empowerment for cocoa farmers in Poli-Polia Village, Poli-Polia District, East Kolaka Regency were well implemented. The training participants were attended by 40 cocoa farmer group members from 50 invitations distributed, showed that cocoa farmers are very enthusiastic to take part in this training.

Benefits of Side-Top Connect

The benefits of side grafting and shoot grafting increase the yields of cocoa farmers, with the shape of the fruit being quite large, and having cocoa yields ranging from 2.5 to 3 kg per tree in one harvest. This is in line with the opinion of Rubiyo and Siswanto (2012) that side grafting and shoot grafting techniques using superior clones can increase the production of cocoa fruit so that it can improve the welfare of cocoa farmers.



Figure 1. Side grafting training

Benefit of Organic Fertilizer

The benefit of organic fertilizer can prevent erosion of the top layer of soil which is a layer containing a lot of nutrients. The use of organic fertilizer also plays an important role in treating/maintaining soil fertility levels that are already in a state of excessive fertilization with inorganic/chemical fertilizer in the soil (Djaenudin et al., 1997; Roidah, 2013; Yang et al., 2004).



Figure 2. Manufacturing Training Organic fertilizer

Benefits of Vegetable Pesticide

The benefits of turmeric vegetable pesticide can produce secondary metabolites and can be used as antimicrobials and natural fungicides are turmeric (*Curcuma domestica* Val). The main ingredients of turmeric are essential oils and curcuminoids. The compounds contained in turmeric have biological activities as anti-bacterial, antioxidant and anti-hepatotoxic (Rukmana, 1994; Sastrohamidjodjo, 2004).

Control of VSD disease using vegetable pesticides made from turmeric has succeeded in reducing VSD disease coupled with pruning, sanitation, and eradication technique (Karmawati et al., 2010; Anonymous, 2011).



Figure 3. Vegetable Pesticide Product Turmeric Extract

Benefit of Harvesting Technique

The benefit of harvesting technique, especially picking cocoa pods, is something that really needs to be considered in harvesting activity. The wrong way of picking can cause a decrease in the productivity of cocoa plants in the following months (Suhendi et al., 2005; Ditjenbun, 2013; Natawidjaya, 2012). So that the results of the training of cocoa pod harvesters are very useful in fulfilling good harvesting technique skills for cocoa farmers.

Benefit of Marketing

The benefit of marketing can be felt directly by cocoa farmers with a very high selling value so that it provides farmers with benefits in increasing the enthusiasm of cocoa farmers to develop cocoa plant productivity.

Based on the results of farmers' responses to the training that has been carried out, as many as 92% of participants from 30 participants who attended the training responded that they really understood the material provided and how to practice the material. While the other 8% did not understand because of education factors and inactivity in field practice so that they had difficulty understanding the traditional cocoa cultivation techniques presented in the training activities. Based on the responses of the participants who mostly understood the training material, then the head of the cocoa farmer group who is also a community leader from Poli-Polia Village tried to make this training one of the main programs in village fund funding so as to ensure the welfare of farmer groups in the village. This program can be a productive economic activity that can increase the income of cocoa farmers that can be carried out in groups in traditional society (Ali et al., 2011; Listiyati et al., 2014).

CONCLUSION

The service activity of traditional cocoa cultivation techniques is an additional knowledge and skill of cocoa farmers in Poli-Polia Village, Poli-Polia District, East Kolaka Regency, with a response of 92% of participants who understand the training material. There are several trainings that are always used by cocoa farmers in increasing the production of cocoa pods, including shoot grafting, the use of vegetable pesticides made from turmeric, harvesting techniques and no less important is direct marketing to trading centers with a selling value that can guarantee an increase in the welfare of farmers. cocoa.

REFERENCE

- Perkebunan. (2011). Statistik Perkebunan Kakao 2009-2011. Jakarta.
- Asmaliyah, Etik Erna Wati H, Sri Utami, Kusdi Mulyadi, Yudhistira, Fitri Windra Sari. (2010). Pengenalan Tumbuhan Penghasil Pestisida Nabati dan Pemanfaatannya Secara Tradisional. Palembang: Pusat Lit-bang Produktivitas Hutan.
- Ali, Darwis dan Rukka, Rusli M. (2011). Peran pedagang Kakao dalam peningkatan efisiensi pasar di Sulawesi Selatan. *Jurnal Sosial Ekonomi Pertanian*, Volume 8 No. 1, Februari 2011. Program Studi Agribisnis, Fakultas Pertanian, Universitas Hasanuddin. Sulawesi Selatan
- Danfar. (2009). Defenisi Efisiensi. Diakses pada tanggal 28 Juli 2017.
- Djaenudin, D. H. Marwan, H. Sub-agiyono dan M. Amy. (1997). Kriteria Kesesuaian Lahan untuk Komoditas Pertanian. Pusat Penelitian Tanah dan Agroklimat. Litbang Pertanian. Jakarta.
- Ditjenbun. (2009). Kakao, Statistik Perkebunan, Direktorat Jenderal Perkebunan Jakarta.
- Ditjenbun. (2010). Kakao, Statistik Perkebunan, Direktorat Jenderal Perkebunan Jakarta.
- Ditjenbun. (2013). Pedoman teknis penanganan pasca panen tana-man kakao. Kementan, Jakarta.
- International Cocoa Organization [ICCO]. (2011). ICCO Quarterly Bulletin of Cocoa Statistics. Vol. XXXVII, No. 2, Co-coa Year 2010/2011. ICCO, London, UK.
- Karmawati, E., Z. Mahmud, M. Sya-kir, I. K. Ardana, S. J. Munar-so, dan Rubiyo. (2010). Budi-daya dan Pasca Panen Kakao. Puslitbangbun Badan Litbang Pertanian. 92 p.
- Listiyati Dewi, Agus Wahyudi dan Abdul Muis Hasibuan. (2014). Penguatan Kelembagaan untuk Peningkatan Posisi Tawar Petani dalam Sistem Pemasaran Kakao. *Jurnal Tanaman Industri dan Penyegar*, Balai Penelitian Tanaman Industri dan Penyegar, Sukabumi
- Natawidjaya. (2012). Penanganan pasca panen tanaman Kakao, Pe-tunjuk teknis peralatan penanganan pasca panen tanaman perkebunan. Direktorat Jenderal Perkebunan Kementan, Jakarta.
- Nursyamsu, R. (2018). Pelatihan Peningkatan Kapasitas Pemuda Dan Pembuatan Program Kerja Pada Organisasi Pemuda Desa Cibiruang, Kabupaten Kuningan. *Empowerment : Jurnal Pengabdian Masyarakat*. <https://doi.org/10.25134/empowerment.v1i02.1572>
- Rukmana, R. (1994). "Kunyit". Yogyakarta: Kanisius.
- Roidah, I.S. (2013). Manfaat penggunaan pupuk organik untuk kesuburan tanah. *Jurnal Universitas Tulungagung Bo-norowo*, Vol. 1(1): 30-42.
- Rubiyo dan Siswanto. (2012). Peningkatan Produksi Dan Pengembangan KAKAO di Indonesia. *Buletin RISTRI* Vol 3 (1) 2012.
- Sastrohamidjojo H. (2004). Kimia minyak atsiri. Yogyakarta : Gajah Mada University press.
- Suhendi, D., H. Winarno dan A.W. Susilo. (2005). Peningkatan produksi dan mutu hasil kakao melalui penggunaan klon baru. *Pro. Simp. Kakao*. Pusat Penelitian Kopi dan Kakao Indonesia, Jogjakarta, 4-5 Oktober 2004: 98-111.
- Yang S. M., F. M. Li, S. S. Malhi, P. Wang, D. R. Suo, and J. G. Wang. (2004). Long-term fertilization effects on crop yield and nitrate-N accumulation of organic manure and fertilizers on crop yield and nitrate-N accumulation in soil in North-western China. *Agron. J.* 96: 1039-1049.