



**Pusat Kajian Hortikultura Tropika**

Lembaga Penelitian dan Pengabdian kepada Masyarakat – Institut Pertanian Bogor

# **SDGs REPORT CENTER FOR TROPICAL HORTICULTURE STUDIES IPB**

**2021**





## COMMERCIALIZATION OF NEW SHALLOT VARIETY FOR NATIONAL SHALLOT SUPPLY STABILIZATION



Time:

August 4, 2021 – December 23, 2021

Lead researcher :

Prof. Dr. Ir. Muhamad Achmad Chozin, M.Agr

Research team :

Prof. Dr. M. Firdaus, SP, M.Si  
Dr. Awang Maharijaya, SP, M.Si  
Dr. Heri Harti, SP, M.Si  
Dr. Ir. Suryo Wiyono, SP, M.Si  
Dr. Endang Gunawan, SP, M.Si  
Kusuma Darma, SP, M.Si

Shallot (*Allium ascalonicum*) is one of strategic horticultural commodities in Indonesia. As one of the staples, the price of shallots is often unstable, and it affects inflation, due to the constant price fluctuations of shallot.

One attempt to increase shallot productivity is by developing superior varieties of shallots and providing their seeds. From previous studies, PKHT IPB has produced several superior varieties of shallots with high productivity, including Tajuk and SS Sakato which are able to achieve productivity of 16 and 28 tons per ha, far above the national average of 9.3 tons per ha. Currently the seed bulbs of these new varieties are not yet available in large quantities. Therefore, commercialization is necessary because the new released varieties has proven to be superior in the field. With the availability of superior quality seed bulbs, it will help to increase productivity and in the end it will support the stability of production and prices of shallots in Indonesia.

The general aim of this research is to improve shallot production stability and the availability of a high quality seed bulbs for the new superior shallot varieties that have been developed in previous studies by increasing the productivity, quality and continuity of shallot supply. The specific objective of this research is to increase the availability of quality seeds from new high yielding varieties through:

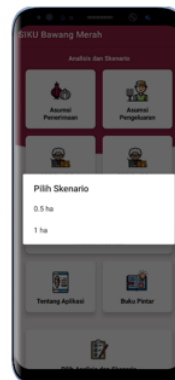
- 1) Production and dissemination of new superior varieties seed bulbs in an effort to commercialize studies results,
- 2) improve the environmentally friendly shallot cultivation,
- 3) Development of business model and information system on the feasibility of shallot horticulture business.

This research activity is the second year activity. Up to December 2021, shallots have been planted for certified shallot seed production in Solok Regency (SS Sakato Seed) and Nganjuk Regency (Tajuk Seed).

In addition, shallots have been planted for Demfarm (Demonstration farm) in Kuningan Regency (SS Sakato variety), Tegal Regency (Tajuk variety), Kebumen Regency (Tajuk variety and SS Sakato), and Blitar Regency (Tajuk variety).

Intellectual Property Rights (HaKI) in the form of Copyright of “SIKU Bawang Merah” are in the registration process. And finally, a scientific publications have been submitted to the proceedings of the 2021 Southeast Asia Vegetable International Symposium

## Contribution to SDGs





## AVAILABILITY IMPROVEMENT FOR HIGH QUALITY SEED AND VARIETY OF CAYENNE PEPPER TO INCREASE THE WELFARE OF CHILLI PEPPER FARMERS IN INDONESIA

Cayenne peppers (*Capsicum frutescent*), has a very high economic value and has been widely cultivated in Indonesia. Cayenne pepper is used as a raw material for the food and pharmaceutical industries. And also used as an important seasoning for Indonesian cooking. Cayenne pepper contains minerals, vitamins and essential amino acids and contains alkaloids, phenolics, glycosides, and limonoids.

The productivity of cayenne pepper is still below the potential yield value of 20 tons ha<sup>-1</sup>. Farmers still mainly used low-producing local varieties, which causes the low productivity of cayenne pepper and that is why Indonesia cayenne pepper production is still below the potential yield value. A diverse collection of germplasm is needed to support breeding activities. In this case, PKHT IPB has succeeded in collecting some cayenne pepper germplasm in previous studies. The results of the evaluation and characterization of the germplasm were cayenne pepper varieties Loblita 1 and Bonita. Cayenne pepper planting activities are carried out through demonstration farm (demfarm). This activity aims to improve the knowledge, attitudes and skills of cayenne pepper farmers in three provinces, namely East Java, Yogyakarta, and West Java. In addition, this study also produced 50 kg of cayenne pepper seed.



Time:

August 4, 2021 – December 23, 2021

Lead researcher :

Prof. Dr. Ir. Sobir, M.Si

Research team :

Dr. Awang Maharijaya, SP, M.Si

Prof. Dr. M. Syukur, SP, M.Si

Dr. Ir. M. R. Suhartanto, M.Si

Dr. Endang Gunawan, SP, M.Si

## Contribution to SDGs



This study is a follow-up study, lasting until December 2021. In this study, further development of cayenne pepper cultivation technique was done through demonstration farming (demfarm) with an area of 10 ha in three provinces of cayenne pepper production centers, namely East Java, Yogyakarta, and West Java. Demfarm activities in East Java Province are located in Blitar Regency with an area of 2 ha and Kediri Regency with an area of 1 ha. Cayenne pepper demfarm in Sleman Regency, Yogyakarta, was carried out an area of 4 ha. Meanwhile, cayenne pepper demfarm in West Java Province was carried out in Cianjur Regency with a land area of 2 ha and a demfarm in Bogor Regency of 1 ha. Currently, the production of 50 kg of cayenne pepper seeds of the Bonita variety has begun in Yogyakarta in collaboration with CV. Jogja Horti Lestari (JHL) and seeds of Loblita 1 variety at the Pasir Kuda PKHT IPB Experimental Farm.





## SHALLOT MINI BULB PRODUCTION IN AN EFFORT TO INCREASE THE SUPPLY OF HIGH QUALITY SHALLOT SEED BULBS



Time:

February 10, 2021 – December 30, 2021

Lead Researcher :

Prof. Dr. Ir. Agus Purwito,  
M.ScAgr

Research Team :

Dr. Awang Maharijaya, SP, M.Si  
Dr. Heri Harti, SP, M.Si

One of the main problem in the shallot cultivation system that can cause productivity decline is the lack of availability of good quality seed bulbs as plant propagation material. Currently, only 15% of total seed bulb are fulfilled with good quality seed bulb, while the other 85%, farmers use consumption tubers or imported tubers as plant propagation material. The continuous use of tubers as plant propagation material causes a decrease in tuber quality due to the accumulation of seed-borne diseases that will eventually cause lower productivity. One alternative to overcome the problem of availability of high quality seeds is the use of true seed shallot (TSS) as a source of seed. There are of course a lot of obstacle for using TSS as planting material, especially in Indonesia, namely the difficulty of transitioning adaptation of cultivation techniques from seed bulbs to TSS, plants from TSS require extra care (especially in the early stages of growth), the germination rate shallots directly swon to the ground is still relatively low, causing harvest failure. To overcome this problem, TSS need to be planted and produce mini bulbs, which later will be developed into seed bulbs.

The general objectives of this study is to increase the availability of quality shallot seeds through the production of healthy and high quality shallot mini bulbs from TSS.

The specific aim of this study are:

- (1) Obtain optimal spacing and plant density for shallot mini bulbs production from TSS;
- (2) Study the transmittion scheme of seed borne pathogen and the potential of generation 0 to 3 mini bulbs as extension seed bulbs.
- (3) Obtain the optimum size and number of generation of mini bulb that increase shallot productivity.

This study was done in PKHT-IPB Tajut Experimental Farm, Bogor, West Java Province. Output that have been achieve until the end of 2021 are

- (1) Various sizes G0 mini bulb from TSS;
- (2) *Fusarium oxisporom* and virus analysis on TSS dan G0 bulb to ensure mini bulb produced are free from seed-borne pathogens;
- (3) One draft of scientific publication in national journal.

## Contribution to SDGs





## IDENTIFICATION OF CHILI PEPPER RESISTANCE AND RESISTANCE GENE ANALOG (RGA) TO YELLOW LEAF CURL DISEASE AND ITS VECTORS

The main obstacle in increasing chili pepper productivity is disease. Yellow leaf curl disease which caused by Begomovirus (family Geminiviridae) is one of the important diseases in chili pepper cultivation. This disease is transmitted by the whitefly (*Bemisia tabaci* Genn.). This insect species has a wide genetic diversity along with changes in geographical conditions which greatly affect the genetic structure of whitefly. There are *B. tabaci* biotypes B and Q which are invasive and capable of spreading the virus to several types of plants. The consequence of the interaction of this virus and vector causes plants to experience a decrease in production. Resistant genotype is one of the effective ways to overcome yield loss due to yellow leaf curl disease.

The development of resistant genotypes can be carried out through a series of plant breeding processes. Currently, the main control of yellow leaf curl disease is based on the control of whitefly, including protecting plants using gauze covers in nurseries, planting marginal plants, using *B. tabaci* predators and applying insecticides.

However, this strategy has not succeeded in preventing the spread of the disease. The existence of resistant cultivars is an effective approach to overcome production loss due to the pest attack. There are several genotypes of chili that have the potential to be used as a resistant to yellow curly leaf disease genotype.



Time:

March 22, 2021 – November 22, 2021

Lead Researcher :

Dr. Awang Maharijaya, SP, M.Si

Research Team :

Prof. Dr. Ir. M. Syukur, SP, M.Si

Dr. Ir. Elisabeth Sri Hendrastuti, M.Sc

Dr. Heri Harti, SP, M.Si



## Contribution to SDGs



In the first year of this study, identification of resistance responses was carried out with the aim of obtaining candidate plant resistance from 28 genotypes of Indonesian chili. The test was carried out using the virus inoculation method through the whitefly vector insect (*Bemisia tabaci*) in a greenhouse with a completely randomized design, one factor, and three replications. Observation parameters include incubation period, disease incidence, and disease severity.

This study activities included propagation of vector insects, propagation of virus inoculum, transmission to test plants with vector insects, resistance response testing of several chili genotypes, symptom observation, and confirmation of Begomovirus to confirm yellow leaf curl disease infection.

The chili genotypes observed had various resistance responses to leaf curl disease based on disease severity parameters. The chili genotypes observed were divided into four resistance categories, namely very susceptible, susceptible, moderately resistant, and resistant.

From this research, 2 chili genotypes were identified as a resistant to yellow leaf curl disease genotype and 13 chili genotypes were slightly resistant to the disease.



## SEED DISSEMINATION AND TECHNICAL GUIDANCE “PRACTICAL TECHNICQUE OF CALLINA PAPAYA CULTIVATION”



Time :

31 Juli 2021

Person in charge :

Dr. Awang Maharijaya, SP, M.Si

Team :

Dr. Endang Gunawan, SP, M.Si

Dr. Heri Harti, SP, M.Si

Kusuma Darma, SP, M.Si

Ahmad Kurniawan, SBio

Sulaeman Taufik, SBio

Papaya (*Carica papaya* L.) is one of the popular tropical fruit plants in Indonesia. National consumption of papaya ranks second after bananas. The contribution of this variety is expected to increase papaya economic value so that the competitiveness of quality papaya fruit will increase and farmers' incomes will also increase and will accelerate the pace of agricultural development, especially in the fruit sector.

One of the papaya varieties that is quite popular with the public is the Callina variety. Papaya Callina variety is a papaya variety that can grow well in low to medium lands with an altitude of 100-500 meters above sea level. This papaya was developed by the Center for Tropical Fruits Studies IPB with the breeder Prof. Dr. Sriani Sujiprihati and Team. This variety was released by the Minister of Agriculture of the Republic of Indonesia on May 26, 2010. Callina papaya weighs about 1 kilogram per fruit, is cylindrical in shape, large in size with a length of about 23-24 cm and a fruit diameter of about 9 cm. Other characteristics of Callina papaya fruit are orange flesh with a sweet taste and moss green skin. The productivity of this variety is 69 – 79 tons per hectare per 4 months.

Around 90% of papaya production is still used for domestic consumption, while only 10% are for export. Therefore, the opportunity to cultivate papaya is actually still wide open. As one of the efforts to encourage papaya cultivation, especially Callina papaya, PKHT-IPB held a Technical Guidance activity with the title "Practical Technique of Callina Papaya Cultivation" via Zoom.

In this event, in addition to the explanation of Callina papaya cultivation, from seeding, care, to harvesting, as well as interactive discussions.

## Contribution to SDGs

