



BIOTROP Courier



Detection Method of COVID-19, A Significant Step to Prevent Its Spread

BIOTROP Conducts Online Training Series on Urban Agriculture

Ecoprint: Preserving the Beauty of Nature in Your Fabric

BIOTROP COURIER

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Director's Message

Dear valued Readers,

The pandemic of COVID-19 has affected most of programmes implementation in every institution, BIOTROP is not an exception. Following the letters of Secretary General, Ministry of Education and Culture of the Republic of Indonesia and SEAMEO Secretariat, SEAMEO BIOTROP Director issued letter no. 783/S.Edaran/III/2020 dated 16 March 2020 on regulation to prevent COVID-19 spread in SEAMEO BIOTROP. For the first time, BIOTROP decrees an instruction for the staff to conduct Work from Home (WFH) starting from 17 to 27 March 2020. Furthermore, through a series of letters, BIOTROP extended WFH mechanism until 3 June 2020.

In responding to the issues of COVID-19, one of BIOTROP's research assistant wrote an article on Detection Methods of COVID-19, A Significant Step to Prevent Its Spread. The article was written to inform our readers that testing is one of the key factor in tracking the transmission of COVID-19, which is important during the pandemic period for quickly identifying and isolating people having symptoms of COVID-19.

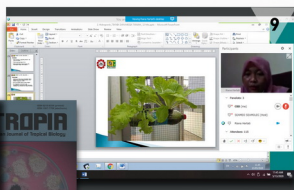
Instead of conducting usual face to face activities that required physical attendance, during the WFH period BIOTROP conducted several online activities, including Training Course on Urban Agriculture and Sharing Session with BIOTROP's Experts. However, online activities for some reasons are more efficient and effective in terms of cost and number of participants. Therefore, after the full WFH mechanism ended on 4 July 2020 and BIOTROP regulates half Work from Office (WFO) and half WFH, online activities will still be conducted. The WFO mechanism is conducted by following health protocols as suggested by WHO and Indonesian Government. During WFO, everyone is required to wear mask and wash hands more often than usual. These online activities and new daily practices are considered as 'New Normal' activities.

In order to enhance the Centre's staff capacity, Deputies Director of seven SEAMEO Centres in Indonesia initiated an in-house training activity through series of online sharing session on various areas of administration and management expertise. Centres' staff who have expertise in certain field served as resource persons. Board of Directors and staff from seven SEAMEO Centres in Indonesia joined the online sessions.

We do hope the pandemic of COVID-19 will be over soon. Nevertheless, with the support of information technology advancements, BIOTROP has transformed its services by embracing online activities to reach more beneficiaries and broader coverage with more cost effective. We are fortunate that Pandemic, enables us to intensify our online programmes which has been initiated for the last two years. We have to be ready to be part of 'New Normal' life and we are optimist that we will produce high achievement with hard work and smart work. Stay healthy and safe!

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Detection Method of COVID-19, A Significant Step to Prevent Its Spread

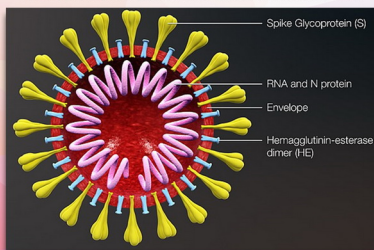
In early December 2019, an outbreak of pneumonia caused by a novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), occurred in Wuhan City, Hubei Province, China. A month later, on 30 January 2020, the World Health Organization (WHO) declared the outbreak as a Public Health Emergency of International Concern and officially named the outbreak as coronavirus disease 2019 (COVID-19). By May 29, 2020, the global death toll reached 362,024 (worldmeters.info). COVID-19 is clearly a serious disease of international concern. Disrupting the chain of transmission is considered the key to stopping the spread of the disease.

Testing is one of the key factor in tracking the transmission of COVID-19, and it is important during the pandemic period for quickly identifying and isolating people having symptoms of COVID-19. Data generated from testing can be used to calculate the accurate infection rates, which is critical for stakeholders in strategically managing decisions to handle the uneasy situations caused by the COVID-19.

Many diagnostic tests for COVID-19 are available so far. The tests are based on two different methods, i.e., detection for virus and detection for antibody.

1. RT-qPCR (Reverse Transcription Quantitative Polymerase Chain Reaction)

Quantitative PCR/qPCR has been widely used in research and medicine to detect genetic information from DNA or RNA, and also known as fairly rapid, sensitive and reliable for detection. RT-qPCR is a technique used when RNA is being detected. The single strain RNA is converted into double-strand DNA by reverse transcription (RT) mechanism. SARS-CoV-2, the virus causing COVID-19 is an RNA virus and, therefore, it is necessary to apply this RT mechanism for detection purpose. RT-qPCR looks for the presence of viral RNA in a sample taken from the patient (usually a nasopharyngeal swab). The test aimed to know whether or not a patient is currently infected by the virus. The RNA virus contains genetic information including the sequence of a specific region for virus detection, usually the Spike protein (S), N protein, and/or the Envelope sequences. This targeted sequence will be amplified into billion copies in a qPCR machine and the fluorescent marker is used to detect the virus.



Structures of a virus (source: https://www.cebm.net/wp-content/uploads/2020/04/2a.virus_diagram_link.png)

Once a sample has been collected and stored in the Viral Transport Media (VTM), the sample was taken into a laboratory to conduct the detection procedure. RT-qPCR method is consisted of two main steps and needs 3-4 hours to complete per batch. The first step is to isolate the RNA virus from the sample. The second step is RT and qPCR reaction performs in the same tube, started by adding the RNA template sample, primer, and probe continued by amplifying and detecting steps in the qPCR machine. The results are used to establish the diagnosis for the patient. To reach research purposes, sometimes the process is continued to the sequencing process, which is then shared with researchers worldwide for conducting the next studies, such as monitoring the possible virus mutation and global epidemiology studies.

An RT-qPCR test is highly sensitive and fairly reliable if performed on a sample from an infected part of the body, while an active infection is occurring. However, this test cannot detect if a person has had the virus and has recovered.

2. Serological Test

Serological test is based on the immunochromatography principle which is a combination of chromatography and immunoassay, also known as Lateral Flow Immunochromatography (LFI). This assay can detect either antibodies (for detection of antigens) or antigen (for detection of antibody). People have commonly been referred Serology test as the "Antibody test". The assays use the same technology commonly used for pregnancy tests.

In the case of COVID-19, this test looks for the presence of antibodies rather than detecting the antigen (virus) itself. Antibodies are specific protein made in response to infections by antigen. If someone had virus infection of SARS-CoV-2, their body will respond by producing specific antibodies (IgG and IgM) between 7 and 11 days post-exposure to the virus. These antibodies produced can be detected using the antibody test device.

Antibody test uses a small sample of patient's blood taken from a vein or a finger-prick by a clinician. As the sample dropped onto a spongy pad and moved through the device, it will hit the conjugation pad containing the COVID-19 antigen conjugated to gold nanoparticle (AuNP) colloid. During this stage, any antibodies in the sample with specificity for COVID-19 will bind the antigen and its conjugated gold nanoparticle. Next, the sample (the conjugate complex) moves to the nitrocellulose membrane containing an immobilized antibody that recognizes human IgM (first line), IgG (second line), and the control (third line). However, only human antibody/COVID-19 antigen/gold nanoparticle complexes will produce a visible coloured line which can be seen by the eye. The appearance of red-purple line on the membrane indicates the presence of antigen of interest in the sample. Since the liquid of the sample migrates through the membrane very fast; thus, it is possible to detect the presence or absence of antigen within 15-20 minutes. The reactive result from this testing indicating that the patient has COVID-19 or has recovered from COVID-19. However, it cannot distinguish between an active and a previous infection.

Antibody test results are especially important for detecting previous infections in people who had few or no symptoms. The test also functions as part of surveillance efforts to better understand how much of the population has been infected with SARS-CoV-2 and how the virus is spreading through the population over time. It is important to understand the potential consequences of lifting or enforcing measures to control the virus such as quarantine, social distancing, educational institution and workplace closures. The technology is being tested for antigen (virus) by detecting proteins from active virus directly.

RT-qPCR and serological tests have its own distinct advantages and disadvantages inherent to the underlying technology. A combination of testing types used at different times may be useful for patient management and population pandemic control of COVID-19. (and)

Sources:

<https://www.cebm.net/covid-19/what-tests-could-potentially-be-used-for-the-screening-diagnosis-and-monitoring-of-covid-19-and-what-are-their-advantages-and-disadvantages/>

<https://www.who.int/news-room/commentaries/detail/advice-on-the-use-of-point-of-care-immunodiagnostic-tests-for-covid-19>

<https://www.worldometers.info/coronavirus/world-wide-graphs/#total-deaths>

BIOTROP's Fast Response Action in Coping with Covid-19 Situation

Ever since the news about the existence of deadly virus Covid-19 is spread in Indonesia, SEAMEO BIOTROP has started its precautions arrangements in making sure that the staff's health is kept in the highest level.

Each arrangement is tailored following regulations from the government. When the first social distancing policy was aired, the Centre took the initiative to arrange its staff's arrivals and departures using the Centre's vehicles and drivers. Only three staff were allowed to be present in each unit/department. The managers decided which staff should be in each day. In this period, the staff were obligated to wear mask in the Centre's vicinity, including inside the vehicles. This arrangement was in effect for two weeks.

Then the situation becomes critical to urge everybody to stay home completely. The first Work from Home (WFH) policy is started in the third week of March and is renewed every two weeks. The most current policy is in effect up to the end of May 2020.

During the WFH period, the Centre does its best to fulfil basic food needs of each staff. Care packages consisted of rice, canned food, soy sauce, instant noodles, sugar, lemon (fresh fruit), beef floss, cooking oil, cookies and hand sanitizer, made by SEAMEO BIOTROP's Services Laboratory following WHO's guidelines, were personally delivered to each staff. SEAMEO BIOTROP also delivered hand-made masks to each staff. The Centre's cleaning service personnels were mobilized to disinfect each office room using disinfectant made by SEAMEO BIOTROP's Services Laboratory following WHO's guidelines.

Various efforts to enforce the "wear-a-mask" regulation in the Centre's vicinity are done by voicing the regulation through managers-staff channels, x-banners, posters as well as social media postings.

It is sadly admitted though, that there are still gaps of awareness and understanding about the fierce and deadly effects of this virus among the Centre's staff, despite broad mass media expose and tireless efforts from the government and its

apparatus to clearly explain the importance of social and physical distancing as well as wearing mask at all times.

The management of SEAMEO BIOTROP keeps doing its tireless best to build awareness and understanding to its staff about the deadly effect of the virus as well as all steps to prevent ourselves from having the virus inside us and to cut off the spread of the virus. (sis)

TATA CARA PENGGUNAAN MASKER

Bekerja bersama, memutus mata rantai Corona

Sebelum menggunakan masker, pastikan tangan dalam kondisi bersih. Cuci tangan dengan sabun atau gunakan hand sanitizer.

Pastikan masker menutupi hidung dan mulut Anda, serta tidak ada celah antara wajah dengan masker.

Lepas masker dengan cara hanya memegang bagian tali. Segera cuci tangan atau gunakan hand sanitizer setelahnya.

Segera ganti masker setelah terasa lembab (maks 3 - 4 jam).

Segera sisihkan masker yang telah digunakan, dan segera buang (untuk masker medis), atau cuci sebelum digunakan kembali (untuk masker kain).

Seamless World Indonesia
Kerjasama Tim Pakar Gugus Tugas Percepatan Penanganan Covid-19

BIOTROP's Covid-19 Task Force in Dealing with the Virus Pandemic

Entering the transition from Large-Scale Social Restrictions to New Normal, SEAMEO BIOTROP formed a Task Force on 5 June 2020 to prevent and reduce the spread of Covid-19 virus in its area and to protect its staff from this virus contamination. The establishment of this Task Force was based on:

1. Presidential Decree Number 11 of 2020 concerning Determination of Covid-19 Public Health Emergency;
2. Presidential Decree Number 12 of 2020 concerning Determination of Non-Natural Disasters of Covid-19 Spread as a National Disaster;
3. Circular Letter of the Minister of State Apparatus Empowerment and Bureaucratic Reform Number 57 of 2020 concerning the Fourth Amendment of the Circular Letter of the Minister of State Apparatus Empowerment and Bureaucratic Reform Number 19 of 2020 concerning Adjustment of the Work System of State Civil Apparatuses in the Prevention of Covid-19 in Government Agencies;
4. Decree of the Minister of Health Number HK.010/7/MENKES/328/2020 concerning Guidelines for Prevention and Control of Covid-19 in Office and Industrial Workplaces in Supporting Business Sustainability in Pandemic Situations; and

5. Circular Letter of the Minister of State Apparatus Empowerment and Bureaucratic Reform Number 58 of 2020 concerning the Work System of Civil Servants in the New Normal Order.

In carrying out the Covid-19 Mitigation Handling strategy at BIOTROP, the Task Force has five fields of work, namely prevention, public relations, secretarial, financial as well as logistics and security. There are five programs implemented, namely risk mapping; monitoring; information dissemination; socialization and education; as well as early warning and countermeasures.

Through the establishment of this Task Force, coordination, control, supervision and operational plans for the working staff become more intensive, integrated, directed and synergised with the Covid-19 Task Force of Bogor City and the neighbouring Village of Pakuan. The Task Force has issued health protocols for official assignments in the office, at home and outside the office, and for guests visiting the campus. All staff working in the office are required to wear masks, wash hands, use hand sanitizer and check body temperature as often as possible. In addition, the Centre also provides lemon ginger tea drinks that are useful for increasing body immunity. (zsp)

Socialisation of Covid-19 Pandemic Management by Bogor City's Covid-19 Task Force

BIOTROP's Covid-19 Task Force invited Bogor City's Covid-19 Task Force on 24 June 2020 to have a more intensive discussion and obtain clear directions in handling Covid-19 virus pandemic.

In his opening remarks, Drs Dedie A. Rachim, MA, the Vice Mayor of Bogor City, said that there are three aspects that must be considered in handling the Covid-19 pandemic, namely health, social impact and economic recovery. In Bogor City, around 159 thousand families are registered to receive aids due to loss of livelihoods. This economical aspect is very challenging because the economy has been greatly diminishing during the pandemic, both in the community and government levels. For this reason, he suggested that BIOTROP should provide knowledge on urban farming in supporting food security to the surrounding communities. During the visit, the Head of Bogor City's Health Office, dr Sri Nowo Retno, MARS, said that the Covid-19 virus attacks the respiratory tract and spreads through droplets that enter the mouth, nose and eyes. Because there is no vaccine yet, each individual must cover these three facial areas with a mask, refrain ourselves from touching these three facial areas, wash hands and apply hand sanitiser containing at least 75% alcohol, and keep a personal distance at least 2 meters. She also mentioned that human beings with comorbid diseases such as diabetes and heart disease as well as the elderly have a higher risk if being exposed to this virus.

dr Retno further explained that Bogor City is currently still included in the yellow zone. The number of Covid-19 positive patients in Bogor reached its peak in the 4th week of March and the 1st and 2nd week of April, and after that it declined,

but then rose again after Eid al-Fitr. At the beginning of the pandemic, symptoms that appear are fever, cough, shortness of breath, fatigue and lethargy like other symptoms of viral infection. But now, about 80% of sufferers only experience mild symptoms; hence, many people do not realise that they have been infected.

To deal with this pandemic, cooperation and commitment from all parties are needed. Every individual is required to be discipline and honest. Socialisation and education to the public regarding efforts to prevent Covid-19 virus, especially in terms of cleanliness and the use of masks, are also needed so that communities will not be afraid and patients do not feel ostracised. (zsp)



A group photo with Bogor City's Covid-19 Task Force

Centres' Staff Improve Capacity Development through Sharing Sessions among 7 SEAMEO Centres in Indonesia during WFH

After 37 days since the confirmed first two cases of Covid-19 victims in Indonesia on 02 March 2020, the Indonesian Government updated the increase of Covid-19 cases to become 3,293 persons positive, 280 died and 252 recovered on 9 April 2020. Since then, as the follow up action to address the significant increase in the number of positive Covid-19 cases, the Indonesian Ministry of Education and Culture (MoEC) gradually issued letters on the extension of Working from Home (WFH) regulation. In accordance with the Indonesian MoEC's instructions, 7 SEAMEO Centres in Indonesia extended the WFH scheme until 04 June 2020.

The long period of WFH implementation has significantly affected the Centre's research and training activities. The grantees of research projects modified all of their research activities into indoor activities, while several training courses were conducted online.

Deputies Director of seven SEAMEO Centres in Indonesia initiated an in-house training activity through series of online sharing session to enhance the skills of the Centres' staff on various areas of expertise. Centres' staff who have expertise in certain field served as resource persons. Board of Directors and

staff from seven SEAMEO Centres in Indonesia joined the online sessions.

The series began on 04 May 2020 with 'Public Speaking' topic, presented by Mr Cepri Maulana from SEAMEO CECCEP. The topic of the second session was 'Personal Development to Build Professional Personal Character', presented by Dr Trisnani Widawati from SEAMEO QITEP in Mathematics on 08 May 2020. The third session was held on 11 May 2020, with the topic of 'Tips and Tricks on Utilizing Microsoft Excel' by Rizwan Darmawan, MM, from SEAMEO QITEP in Science. Mr Ahmad Thohir Hidayat from SEAMEO RECFFON became a resource person for the fourth session by delivering a topic on 'Introduction of Electronic Sign (eSign) and Its Use in SEAMEO RECFFON' on 13 May 2020. The next session was presented by Mr Puryanto from SEAMEO SEAMOLEC on 14 May 2020 with the topic of 'Creating an Effective PowerPoint Slide for Presentation'. Dr Luh Anik Mayani from SEAMEO QITEP in Language was the sixth resource person with a topic of 'Indonesian in Official Document Administration' on 18 May 2020. The activity was ended by a presentation from SEAMEO BIOTROP on 20 May 2020. The Centre featured Ms Santi Ambarwati, MSI, to share information on the implementation of quality management goals. (rf)

SEAMEO BIOTROP's First Online led Al-Fitr Gathering: Muslim's Attitude toward the New Normal Era

The online gathering was held on 3 June 2020 featuring HR. Rhoma Irama, an Indonesian well-known ustadz and singer as resource person. The gathering was virtually attended by 100 people from SEAMEO BIOTROP and BoDs from other SEAMEO Centres in Indonesia.

In his talk, HR. Rhoma Irama shares Islam's perspective in responding to disasters, especially the one that we are currently experiencing worldwide, the Covid-19 plague. As Muslims, we need to be retrospective of Islamic viewpoints of disaster i.e., as test of faith and as warning.

Disaster as test of faith bears a meaning that human beings will be tested to prove their true faith to Allah SWT. With true faith, human beings accept that any disasters that they experience are already written in al-Lawh al-Mahfuz (the Preserved Tablet: the place where the decrees of Allah are kept). Based on this, human beings shall refrain from overly joyed due to happiness and from excessively saddened due to misery, because any occurrences that happened in our lives are already determined by Allah long before we are born to this world.

Disaster as warning indicates that human beings should be aware of any deeds that they do to the nature and other God's creations. In the long run, any wrongdoings to the nature and other God's creation will come back in the form of disaster, as warnings for human beings.

Human beings are created by Allah to worship Allah. In the journey, human beings face a lot of temptations and hence, make mistakes along the way. Ramadhan, the holy fasting month, is meant for cleansing the mistakes. It is believed that



Staff participates in the online led Al-Fitr gathering

after passing through the Ramadhan patiently, sincerely and consistently, the mistakes will be forgiven. It is hoped that no more mistakes will be done afterwards.

led Al-Fitr celebration is held after the Ramadhan as a token of thankfulness for having passed the Ramadhan safely.

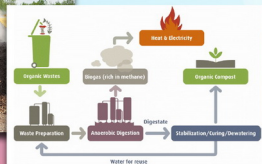
Subsequently, human beings should maintain the Qana'ah attitude in their lives. Qana'ah is the feeling of contentment with the blessings that Allah has bestowed upon us. Such contentment affirms their belief in Allah's decree, and thus they would rather continue to strive and work hard, while praying and doing their best in search of a better life. (zi/sis)



Compost pile (source: <https://www.ozturners.com.au/farm-composting-now-tafe-course>)



A compost turning machine (source: <https://www.vermeer.com.au/equipment/compost-turners/c612-compost-turner>)



Process diagram of anaerobic digestion (source: Iona Capital 2016)

Dr Irdika Mansur, BIOTROP's Director, and Prof Dr Arief Sabdo Yuwono, BIOTROP's Scientist, were invited to be resource persons for the 2nd series of the webinar on Indonesia Mining Environment Management Communication Forum (FKPLPI) with the topic 'Large-scale Mulch and Compost Production using Land Clearing Waste' held on 05 May 2020 via Youtube live. A total of 327 participants joined this webinar session.

Dr Irdika Mansur delivered a topic on 'The Importance of Organic Material in Post-Mine Land Reclamation'. He said that the main problems of post-mining land reclamation are infertile soils due to high clay and sand content, low organic matter and low pH. To overcome this problem, soil organic material, i.e., fully decomposed material (compost) or microorganisms / plants in various stages of decomposition (litter), becomes a promising solution. It maintains soil porosity including water binding capacity; increases the cation exchange capacity so that the soil can better hold nutrients; forms organic metal compounds, thereby reducing the adverse effects of the heavy metal on plants; becomes a source of food for micro and macro soil organisms; in low input system, it provides a balanced supply of nutrients and prevents leaching; and in medium-high input system, it increases the use of fertilizers efficiently through nutrient enhancement.

The soil organic material, he continued, could be obtained from the land clearing debris since it is abundant and potential to be processed as a compost and mulch. The chopped debris is piled up in an area of reclaimed land that has been arranged so that leachate from a pile of organic material can fertilize the soil below and around it. The debris is then turned every few weeks. After becoming compost, it can be used in the field.

"This material is important, especially for the company because it can be processed using various technologies regardless of the length of the composting process and the quality of compost like commercial compost," said Dr Irdika.

Similar to the topic of Dr Irdika, Prof Dr Arief Sabdo Yuwono also presented a topic on 'Large-scale Mulch and Compost Production by using Land Clearing Debris'. He said that the mulch and compost can be made from the land clearing debris using

biological solid waste treatment. The compost production process and technology consist of two pathways, i.e., anaerobic digestion and aerobic composting. Both pathways produce compost, but anaerobic digestion also produces biogas (rich in methane) which can be used as heat source and electricity. The anaerobic digestion does not require oxygen to run the process.

In aerobic composting, he continued, the microorganisms decompose the organic waste in an aerobic environment. The process parameters include temperature, moisture content (50-60%), oxygen supply (15-20%), C/N ratio (30), pH (6-8) as well as biochemical composition and texture.

"There are three composting systems, namely traditional windrow, aerated static pile and in-vessel composting," he said. In traditional windrow system, non-biodegradable fraction is removed, waste is piled up in long rows of almost triangular cross section on hard surfaces, regular turning is required to oxygenate, and decomposition process needs three months. Meanwhile, in aerated static pile system, the waste is piled up in windrow system, ventilation piping system is laid on the floor; aeration is carried out by forcing air through perforated pipes, thus, providing better control, and decomposition process needs 4-6 weeks. In-vessel composting system requires composting process to be carried out in different vessels (reactors), namely horizontal plug flow reactors, vertical continuous flow reactors and rotating drums.

Prof Dr Arief mentioned that compost has many benefits, especially for environment and soil/plants. Compost does not produce air pollution (by not burning anything during its production process) and reduces land requirement for landfill significantly. Compost also increases soil fertility, soil textures and characteristics, capacity of water absorption by the soil, soil microbial activity, the quality of the crops, hormones and vitamins availability for plants and nutrients availability in the soil. In addition, compost also provides economic benefits by saving on transportation and landfill costs, reducing waste volume and generating income.

The offline video about this webinar is available at <https://www.youtube.com/watch?v=0FWjVC9jwHc&feature=youtu.be>. (zsp)

BIOTROP Conducts Online Training Series on Urban Agriculture

In the midst of Covid-19 pandemic, SEAMEO BIOTROP keeps contributing to the improvement of community skills. One of them was by holding an online training series on Application of Urban Agriculture in Support of Family Food Security on 11 May – 12 June 2020 through webex online system. This activity was aimed to 1) increase participants' understanding of the basic concepts of urban agriculture, 2) share knowledge about several urban agricultural technologies that can be implemented appropriately according to existing conditions, 3) share knowledge related to agricultural technology that can be applied to support food supply for families, and 4) provide an opportunity for participants to practice and develop innovative projects related to urban agriculture.

The series consisted of four main themes, in which each had four sessions with various topics. The first eight sessions were hydroponics and aquaculture which were presented alternately by Ms Riana Hartati, SSI, and Ms Shella Marlinda, MSI, the Centre's Research Assistants. Ms Riana delivered topics on Introduction to Hydroponics, Hydroponic Technique and Growing Media, How to Start Hydroponics, and Maintenance and Harvesting; while Ms Shella shared knowledge on Introduction to Aquaculture Technique I, Introduction to Aquaculture Technique II, Harvesting of Aquaculture Products and Introduction to Feed.

The next four sessions were led by Dr Erina Sulistiani, a plant and seaweed tissue culture expert of the Centre, who delivered topics on Tissue Culture Technique for Plant Seedling Production, Stages of Micropropagation of Plant Seedlings, Facilities for Plant Tissue Culture and Aseptic Technique and Plant Tissue Culture Media. Mr Samsul A. Yani, SSI, the Centre's Advisor for Product Development Unit, was the resource person for the last four sessions with the topics of Introduction to Edible Mushroom Cultivation, Making F0 and F1 Mushroom Starter, Making F2 and F3 Mushroom Starter and Baglog Maintenance. To complete the training series, the participants have to accomplish a final task by July 2020.

A total of 200 participants joined the training courses. A livestreaming media was also provided via the Centre's youtube channel (@seameobiotrop) for those who were not able to register to the courses due to limited participant capacity. (zsp)



Seedlings of water spinach



Pear scale goldfishes in an aquarium



Oyster and ear mushrooms cultivation

Chimonobambusa quadrangularis, An Invasive Alien Plant Species with Edible Young Shoots

The Asian region is very rich in bamboo species. There are about 1,012 bamboo species in the world; more than half, 626 species are in China, 102 species in India, 84 species in Japan, 75 species in Myanmar, 69 species in Vietnam and 56 species are in Indonesia, while the rest are distributed around the world, mainly in Asia. One of the noticeable bamboo species is *Chimonobambusa quadrangularis*, which is native to China and Formosa. This species was presumably introduced in 1920 to Cibodas Botanical Garden (CBG), Indonesia, from Japan, as reported by Bruggeman (1927). He mentioned that several species of Japanese bamboo were brought into the botanical garden, which might include this species. Those imported bamboo species were planted at the V and W blocks. However, Dakus (1930) later reported that *Phyllostachys quadrangularis* was grown at the P block. At a later time, this plant was reidentified as *Tetragonocalamus quadrangularis* (Nasution 1963), while others recognized the plant as *Bambusa angulata*. Roemantyo et al. (1988) identified it as *C. quadrangularis* (Franceschi) Makano (SINDATA 2017). Widjaja et al. (2014) confirmed that this particular plant is most likely the one that was introduced around the 1920s from Japan.

Chimonobambusa quadrangularis was reported invading areas inside the Mt. Gede and Pangrango National Park (GGPNP), and

therefore, considered as an invasive alien plant species threatening the integrity of park ecosystem (Tjitrosoedirdjo et al. 2015). Under the condition at CBG, this bamboo species grows prolifically even under the shade of trees, reaching 6 m in height; however, it does not flower at all. Zuhri and Mutagien (2013) suggested that this bamboo species has invaded GGPNP since it has been utilized as the fence separating the CBG area from that of GGPNP. From this fence, rhizomes grew into gaps of GGPNP forest, sending culms to grow between trees and spread rapidly to reach an area called Pasarean. No attempt was taken to eradicate this bamboo species. It was then reported that a colony of *C. quadrangularis* was detected in Tapos, Bogor, Indonesia, with a total invaded area of more than 100 ha.

This bamboo species proliferates vegetatively by sending long aggressive leptomorph rhizomes up to more than 5 m away from the mother plant. The pattern of forming culms may only be diffused along the rhizome or forming tillers on the growing culm to form pluricaespitose type. In its natural habitat in China, *C. quadrangularis* dominates the shrub layer (1 m) of *Davidia involucreta* forests in a dense cover (80-90%) at altitude ranging from 1,570 m to 1,700 m in Guizhou, China (You et al. 2014).



Bamboo invasion



Root structure and bamboo shoots



Height comparison between bamboo and person



Figure 1 Sequential diagram depicting the negative impact of *C. quadrangularis*: (1) invading the neighboring bamboo collection, (2) more damaging invasion in nearby forest, (3) the invasion is done vegetatively by leptomorph rhizome, guerrilla type, (4) edible shoots, (5) peeling off the shoot cover

Chimonobambusa quadrangularis spends more resources for shoot growth and produces more leaves during the wet season; therefore, more photosynthesis provides a greater relative growth rate than that during the dry season. Most resources are stored in those long leptomorph indeterminate thin rhizomes during the dry season. Under high water availability, the rhizome systems will grow further invading gaps in the forest. This growth system is called guerrilla type, where the plant sends its rhizomes first without its culms.

The young shoot of this bamboo species is edible vegetable similar to that of asparagus. The potential young shoot production is determined by the availability of living buds on the nodes along rhizomes. In a well-established community of *C. quadrangularis*, 22 culms/m² inhabit the community with average height of 346.29 cm, and when excavated and counted, there are 1,361 living buds. This plant is really invasive. An experiment was carried out to grow rhizomes of this bamboo species in a greenhouse condition at SEAMEO BIOTROP. The results are presented in Table 1.

Table 1 Growth performance of rhizomes, culms and tillers of *C. quadrangularis* grown in BIOTROP's greenhouse condition

		Sum	Length (cm)	Total nodes
Rhizomes	Primary	7	846	504
	Secondary	22	818.8	431
	Tertiary	17	620	327
	Quarterly	3	27	17
Total		49	2,311.8	1,279
		Sum	Length (cm)	Total nodes
Culms + tillers	Primary rhizome	33	1,408	624
	Secondary rhizome	7	413	141
	Total	40	1,821	765

In one plastic pot of 10 L capacity, *C. quadrangularis* grew 40 culms with 23.12 m length of rhizome carrying 1,278 buds.

To generate its potency as an edible vegetable, the rhizome can be taken at the end of the dry season, planted in a well tilled garden, and then the emerging young shoots can be harvested as a delicious vegetable. (st)

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BIOTROP's Scientist and Research Assistant Join Herbarium Mini Workshop

Dr Sri Sudarmiyati Tjitrosoedirdjo, BIOTROP's Scientist and Herbarium Curator, and Ms Indah Wahyuni, BIOTROP's Herbarium Staff, attended a Mini Workshop on Herbarium at the Faculty of Biology, Universitas Gadjah Mada (UGM), Yogyakarta, on 12 March 2020. The mini workshop with a theme 'An Initial Step to Uncover Tropical Biodiversity' was organised by the Faculty of Biology UGM in collaboration with Hortus Botanicus, Institut Biologie Leiden and Naturalis Biodiversity Center, Leiden.

This mini workshop was generally aimed to broaden the knowledge on herbarium, to improve hands-on experience on proper handling of sample collections and provide opportunities for participants to exchange ideas and experiences. A total of 53

participants with various work backgrounds joined the activity, in which 20 of them are university lecturers.

The mini workshop was opened by the Dean of the Faculty of Biology of UGM, Dr Budi Setiadi Daryono, MAgrSc, and followed by three lecture series. The first one was delivered by Prof Paul J.A. Kessler from Hortus Botanicus, Institut Biologie Leiden, with a topic on 'Past and Future Biodiversity Research in the Hortus Botanicus'. The second one was about 'Biogeography in Past, Present and Future', presented by Prof Peter van Welzen from Naturalis Biodiversity Center. The last one was delivered by Prof Purnomo, MS, from Faculty of Biology of UGM, with a topic on 'Meaning and Function of Herbarium'. The lectures were completed by a practical work on making herbarium specimens. (iw)



Prof Paul J.A. Kessler from Hortus Botanicus, Institut Biologie Leiden delivers his presentation on 'Past and Future Biodiversity Research in the Hortus Botanicus'



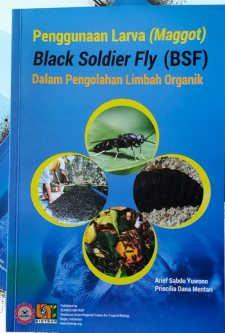
A photo group of participants after practical work on making herbarium specimens at Auditorium Biologi Tropika, Faculty of Biology, UGM

Penggunaan Larva (Maggot) Black Soldier Fly (BSF) dalam Pengolahan Limbah Organik (The Use of Black Soldier Fly (BSF) Larvae in Organic Waste Treatment)

Waste management has become an important issue on the environmental management in Indonesia. The largest percentage of waste in Indonesia is the organic matters, which is 60%, while on the other hand, the waste treatment in the original place is relatively small. Most waste is still transported to the Final Disposal Site (TPA) or landfill, even though the capacity of the TPA has been exceeded. Therefore, a break through is needed to overcome this waste problem; one of them is by making compost in the place of origins such as in households, markets, shopping centres, and business districts.

This book contains a clear description of the decomposition of organic waste using Black Soldier Fly (BSF) larvae, which is a process for treating odor-free organic waste. BSF is a type of insect with the scientific name *Hermetia illucens* L. BSF larvae can digest organic waste, especially those with soft textures. The softer the texture, the faster the decomposition process will be. Moreover, Indonesia has a suitable climate for the development of BSF larvae.

BSF larvae have a great potential to be used in organic waste management, such as in processing market waste, municipal organic waste and dewatered faecal sludge. The larvae are acting as bio-processors of organic waste to produce compost. Furthermore, the nutritious larvae biomass could be used for animal feedstuff. Compost resulting from organic waste decomposition using BSF larvae has been tested and passed standard compost quality according to SNI 19-7030-2004. Treatment of organic waste using BSF larvae can be a promising solution for waste management.



To provide a better understanding to the readers about the use of BSF larvae, this book contains guidelines, research results conducted by the authors, as well as visitation reports from several locations that have used BSF larvae to manage organic waste. This book also comes with references from various sources, both from within and outside the country, to enrich discussion in this subject. (wkd)

Praktik Pengelolaan Limbah Padat dan B3 (Bahan Berbahaya dan Beracun) (Solid Waste and Hazardous-Toxic Material Waste Management Practices)

Waste as a by-product of anthropogenic activities has a real impact on the environment, both physically environmentally and socially economically. Physically, the pile of waste makes the environment less comfortable, less healthy, and less beautiful. Socially, waste interferes with human activities because the collected waste reduces the place that can be used for human activities. Economically, the existence of a pile of waste can reduce the economic value of the land. Therefore, the role of waste management becomes very important so that waste can become a product containing an economic value.

Waste management generally uses containers, transfer depots, and landfills. Some landfills manage the waste properly, so the areas are neat and serve as parks for the surrounding community. The Wastewater Treatment Plant system is described in detail to maintain safe quality for leachate (sewerage water) entering the surrounding waters. The garbage bank system triggers the surrounding community to sort waste from the house because the price of each type of waste is different. The composting system for organic waste is also activated. The management of hazardous and toxic waste (B3 waste) in various hospitals is illustrated by the emphasis on the safety of the B3 waste management system.



This book is a summary of various research results aimed at sharing information about solid and hazardous-toxic wastes treatment in various locations in Jakarta, Bogor, Depok, and Bekasi. The authors explained the waste management in each region in a systematic way; thus, the readers can obtain the whole essence of the book. (wkd)

Ecoprint: Preserving the Beauty of Nature in Your Fabric

Ecoprint is a natural printing method arising from the combination of Art and Nature. The colors come from flowers, leaves, barks and other plant parts. The leaves used can be fresh or preserved leaves. Color pigments from natural plants are transferred into fabric by means of steaming and pressing.

Natural dyeing is a very slow process, but that is the beauty of it. By exercising ecoprint activity, we learn to slow down and just look around, and observe what nature can do for you. It is time for everyone to think about what makes your clothes? Wouldn't you prefer to wear something unique?

Simple steps how to produce ecoprint on garment:

1. First of all, you just need to go for a walk and see what plants you can find around you. Start by looking for fallen leaves and flowers. Choose the ones you like, especially those having a unique shape!! We always suggest to check if the leaves left any marks on the ground. If they do, then you will definitely get a strong print. From our observations, it is better to take leaves after a few sunny days because leaves usually lose their color strength after the rain due to excessive water dilution.
2. Choose your fabric. We recommend you to start with silk (eco-friendly silk is available at local stores) or cotton as they absorb the dye much easier.
3. The next step is to place your plants anywhere you want on your fabric and make a tight bundle.
4. If you are not a very patient person, then the best way would be to cook the fabric which has already had leaves on it. You can steam it. You will see colors slowly coming through and you will know when it is ready. Do not oversteam it though; colors from some plants can start disappearing if you have left it for too long. So, check on it regularly and do not forget to add more water if necessary. It takes about 2-6 hours to steam the fabric. Then, take it out and let it cool down and dry. This will allow for a stronger print. Time really matters when it comes to eco-printing.
5. This part of the process is always very exciting! Let your fabric hang in the shade and dry completely before rinsing. You do not have to rinse at all if you do not want to. Quite often it will smell really good and you can just wear it straight away.

Please do not be disappointed if the results are not what you have expected. It is all about experimenting and learning how different plants react to different fibers. We had so many failures when we just started. However, if you are persistent you will see a real magic appear right in front of your eyes in no time. If we can do it, so can you. (wkd)



Call for Papers – BIOTROPIA Journal

SEAMEO BIOTROP invites submission of scientific manuscripts on tropical biology and related subjects to be published in its international journal called BIOTROPIA. Only manuscripts that have passed a peer-review process shall be published. BIOTROPIA is a Scopus-indexed journal since 2012.

For more information, please contact:

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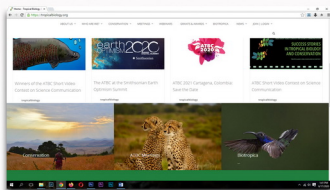
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Useful Websites related to Tropical Biology

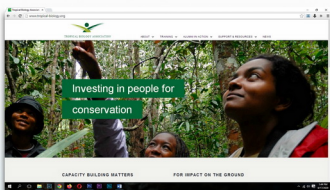
<https://tropicalbiology.org/>

The Association for Tropical Biology and Conservation (ATBC) is a scientific professional society formed in 1963 as the Association for Tropical Biology. In 2003 the society changed its name to the Association for Tropical Biology and Conservation. The ATBC promotes research, education, conservation and communication on tropical biology and concerns with issues of science, conservation, development and environmental policy in the tropics. Its 900 members are consisted of students, researchers, educators and conservation practitioners from 67 countries. The society holds annual meetings around the world, publishes a scientific journal called Biotropica and is increasingly engaged in worldwide conservation and capacity building activities.



<http://www.tropical-biology.org/>

The Tropical Biology Association (TBA), established in 1993, is a founder member of the Cambridge Conservation Initiative (CCI) — a collaboration of leading biodiversity conservation organisations and the University of Cambridge, aimed to transform global understanding and secure a sustainable future for all life on Earth. The Association focuses on capacity building for conservation by conducted training courses and enables scientists, project managers and educators, working in the tropics, to manage and safeguard biodiversity on a long-term basis. It also co-organises the Student Conference on Conservation Science — the only annual forum specifically held for young conservation scientists to deepen their knowledge, share ideas and build networks.



<https://tropicalstudies.org/>

The Organization for Tropical Studies (OTS) is a nonprofit consortium of about fifty universities, colleges and research institutions worldwide. Founded in 1963, OTS' mission is to provide leadership in education, research and the responsible use of natural resources in the tropics. Its purpose is to sustain tropical ecosystems by driving scientific discovery and knowledge, enriching human perception of nature and enhancing worldwide policy actions in the tropics. For the last half century, the Organization has been the world's leading institution in the study of tropical biology, with more than 360 research-oriented field courses in tropical ecology, conservation and global health, and over 8,000 undergraduates, graduates and professionals trained, including many of the world's leading tropical ecologists. (zsp)

