Security in food, renewable resources, and natural medicines

SFRN 2019

PROCEEDING

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3rd INTERNATIONAL CONFERENCE ON SECURITY IN FOOD, RENEWABLE RESOURCES, AND NATURAL MEDICINES 2019 (SFRN 2019)

Convention Hall Politeknik Pertanian Negeri Payakumbuh
INDONESIA

QUANTUM-LEAP OF AGRI-FOOD SYSTEM 4.0 AND DELIVERY OF SUSTAINABLE DEVELOPMENTS GOALS (SDGS)

September 25-26, 2019

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Welcome Message
Executive Chairman of The 3rd International Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019

Dear Honorable ladies and gentlemen,

Good Morning and Assalamu'alaikum wr.wb

On behalf of the SFRN 2019 organizing committee, I am really honoured and delighted to welcome all of you to the 3rd International Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019 at the State Polytechnic of Agriculture Payakumbuh, West Sumatra Indonesia

Our technical program is rich and varied with 8 keynote speeches and 4 invited talks and more than 170 technical papers split between 8 parallel oral sessions and 1 poster sessions. The speakers and participants came from 8 different countries, consist of Academicians, Scientists, Researchers, Practitioners, Professionals, and Government Officialsin multidiscipline branch of knowledge, who gathered here today to share and discuss new findings and applications of innovations for promoting Food Security, Renewable Energy, Sustainable Resources and HealthCare Free for All, in particular for those who in needs. As the chairman of conference 2019 SFRN, I know that the success of the conference depends ultimately on the how many people who have worked in planning and organizing both the technical program and supporting social arrangements. This year, the conference is jointly organized by the Payakumbuh State Agricultural Polytechnic and Andalas University. We also thank to the steering committee fortheir wise and brilliant advice on organizing the technical program; and also to the the Program Committee, both from the Payakumbuh State Agricultural Polytechnic and Andalas University , for their thorough and timely reviewing of the papersand to the Directorof Payakumbuh State Agricultural Polytechnic and the rector of Andalas University, and the Head of the Institute forResearch and Community Service of Andalas University, and Payakumbuh State Agricultural Polytechnic. Our recognition should go to the Organizing Committee members who have all worked really hard for the details of the important aspects of the conferenceprograms and social activities, and then we extend our gratitude to our students who bore the arduous burden for preparing this event.

We hope this event is also a good step in gaining strengthenn cooperation between our universities as we know that the State Agricultural Polytechnicof Payakumbuh is part of the Andalas University previously, of course the psychological relationship between the State Agricultural Polytechnicand the Andalas University is really close.

Finally on behalf of the committee, we apologize profusely for all the shortcomings and everything that is not properly in organizing this event and hopefully AES-Network contributes significantly to the research and technology for the good of humanity.

Thank you

Fithra Herdian, S.TP, MP

Message from Afro-Eurasia Scientific (AES) Network
3rdInternational Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019

Dear Honorable and Distinguished guests,
Ladies and gentlemen,

Assalamu'alaikum Warahmatullahi Wabarakatuh and Good Morning

On behalf of the AES Network, I am honored and delighted to welcome you to the 3rdInternational Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019 at the Agricultural State Poly Technique of Payakumbuh, Indonesia. I believe we have chosen a venue that guarantees a successful technical conference amid the culture, delicacy and scenery of Payakumbuh, the city of "Rendang".

The AES-Network aims to Promote Livelihood Through Food Security, Promote Future Smart and Green Mobility by Using Renewable Energy, Promote Prosperity by Equally Managing and Distributing the Sustainable Resources and Promoting Enjoyable Long-Life by using Natural Medicines With Free Health Care For All. The AES-Network was established in 2018 and already have memberships from 12 countries. Our members consist of Academicians, Scientists, Researchers, practitioners, professionals, and government officials from multidiscipline branch of knowledge, who gathered and contributed their expertise to share and discuss new findings and applications of innovations for promoting Food Security, Renewable Energy, Sustainable Resources and Free Health Care for All.In particular, the network aims to alleviate the condition of those who in dire needs. In the future, we also expect to provide technical demonstrations, and numerous opportunities for informal networking for Promoting Food Security, Renewable Energy, Sustainable Resources and Free Health Care for All. In this opportunity, we invited you to become our members and join our efforts for a better life to all of mankind.

As a team, we acknowledge the existence of mutual interest among university and college educators, researchers, activists, business sector, entrepreneurs, policy

makers, and all society members. We must promote the need to strengthen cooperation for establishing Security in Food, Renewable Resources, and Natural Medicines in Africa, Europe, and Asia.

The AES-Network believe, a firm foundation for mutual collaboration with the spirit of equality and partnership and thereby contribute towards sustainable development in these three regions.

Therefore, through networking, friendships, and joint efforts, the capacity of our network can be enhanced to address major challenges in securing the Food, Renewable Resources, and Natural Medicines in Africa, Europa, and Asia.Our Network goals areto increase the awareness of educators, researchers, scientific community, business sector, entrepreneurs, and policy makers in Africa, Europa, and Asia, that the future of a better world, lies within their responsibilities, and to improve the networking, mobility and mutual collaboration of scientific community, business sector, entrepreneurs, and policy makers in Africa, Europe, and Asia to energize the delivery of Sustainable Development Goals.

Finally, I hope that, by registering our network, you will be provideda common platform and support the exchange of knowledge, while at the same time, we offer constructive dialogue across and within the various interest and stakeholder groups, including the intended beneficiaries, and arrived at the best solutions to our terminal goal, Promoting Food Security, Renewable Energy, Sustainable Resources and Free Health Care based on scientific evidence in Africa, Europa, and Asianregion.

Thank You for Joining us!

President
Assoc. Prof. Dr. Eng. Muhammad Makky

Welcome Message
Head of Institute for Research and Community Service
Universitas Andalas

Dear Honorable and Distinguished guests,
Ladies and gentlemen,

Assalamu'alaikum Warahmatullahi Wabarakatuh and Good Morning

It is with great pleasure that I welcome the participants of the SFRN 2019 in Payakumbuh, the city of "Rendang", the prime of Indonesian delicacy.

In this esteem event, we share the knowledges, and imparted it to the people. The quest for knowledge has been from the beginning of time but knowledge only becomes valuable when it is disseminated and applied to benefit humankind. It is hoped that this conference will become a platform to gather and disseminate the latest knowledge which can be adopted for securing the food, resources, and health for mankind, in Asian, European and African region.

Academicians, Scientist, Researchers and practitioners from multidiscipline branch of knowledge who gathered here today will be able to share and discuss new findings and applications of innovations for ensuring food security, in particular for those who reside in developing countries. It is envisaged that the intellectual discourse will result in future collaborations between universities, research institutions and industry both locally and internationally. In particular it is expected that focus will be given to issues on environmental and sustainability. Therefore, we urge to all participants, to establish a scientific network that will voice the needs

Researchers in the multi sectoral aspects related to the benefit of mankind have been progressing worldwide. Food is a basic right, while energy drive the world. Human need a lot of resources so the civilization can be flourished. But human is not immune, and thus, ones need to take care of their health regularly. Modern Agri-food systems is the foundations of a decent life, a sound education and the achievement of

the Sustainable Development Goals. Over the past decade, we have witnessed a chain reaction that threatens the very foundations of life for millions of the world's people. Rising energy prices drove up the cost of food and ate away the savings that people otherwise would have spent on health care or education. Unsustainable plantation management induced forest fire and posed haze hazard to the whole Sumatra island and our neighboring countries.

The human cost of the food and energy crisis has been enormous. Millions of families have been pushed into poverty and hunger. Thousands more suffering from the collateral effects. Over the past year, food insecurity led to political unrest in some 30 countries. Yet because the underlying problems persist, we will continue to experience such crises, again and again -- unless we act now. That is why we are here today.

We must make significant changes to feed ourselves, and most especially, to safeguard the poorest and most vulnerable. We must ensure safety nets for those who cannot afford food, or energy, nor even a health service. We must transform agricultural development, markets and how resources is distributed. We must do so based on a thorough understanding of the issues. That is the only possible way we can meet the Goals of Sustainable Development.

Thank You,

Assoc. Prof. Dr.-Ing. Uyung Gatot S. Dinata,MT.

Opening Ceremony
Rector of Andalas University

Dear Honorable and Distinguished guests,
Ladies and gentlemen,

Assalamu'alaikum Warahmatullahi Wabarakatuh and Good Morning

I welcome the opportunity to address you at this important event.

It gives me great pleasure in welcoming you to this 3rdConference on "Security in Food, Renewable resources, and Natural Medicines (SFRN)" 2019. I am delighted that so many have accepted our invitation. I am particularly happy that we have in this room, dedicated individuals from so many stakeholder groups — including our most respected and distinguished guest "The ministry of Agriculture of the Republic of Indonesia". We also welcome the mayor of Payakumbuh and the Regent of Lima Puluh Kota. We extend our welcome to the civil society, the private sector, international organizations; the science community; and others dedicated to help create an environment in which people can escape food insecurity. Imagine what we can do together if we make the security for all as an our top priority, and pull in the same direction. We can make a difference in the lives of millions.

Food is a basic right. Food security are the foundations of a decent life, a sound education and the achievement of the Sustainable Development Goals Access to medicines - a fundamental element of the right to health. Health is a fundamental human right, indispensable for the exercise of many other rights in particular the right to development, and necessary for living a life in dignity. Moreover, human rights principles and language are being used to support resource access claims as rights-based approaches empower individuals and groups to gain or maintain access to natural resources

Much progress has been made during the last decades but much more needs to be done. Millions of people are Insecure worldwide, meaning that they either starve or they do not know from where their next meal, health care or resources will come.

Much of the progress on security has occurred at the expense of our environment. With business as usual, we foresee that the production improvements during the next decade will be less than the last one, while the environmental degradation will continue, and health will deteriorate significantly. Without available resources to seek, mankind will become endanger species in a very short time.

Solutions to the security problems need to be designed and implemented within a new and rapidly changing environment. Globalization and sweeping technological changes offer new opportunities for solving these problems. A number driving forces or trends must be taken into account in developing appropriate action. Some of the action needed, such as appropriate technology for small farms, is not new but it must be cast in the new and changing global and national environment, taking into account new opportunities and risks. I hope that by providing a forum for knowledge exchange, this conference will help identify the action to be taken. Furthermore, this conference will help to provide constructive dialogue across and within the various interest and stakeholder groups, including the intended beneficiaries, and arrive at the best solutions.

In conclusion, even if those responsible give high priority to achieving sustainable security for all and back it up with action, the world may not achieve the goal by 2030. But we will be much closer than with business as usual. I urge all of us to provide the strongest support for this event, to enable securing the food for all in the closest time possible. It is my sincere optimism that through the accomplishment of the objectives of this event, we will come to an important step nearer to secure the food for all.

Finally, I would like to thank the organizing committee who have spent their utmost efforts to prepare and manage this event successfully. Let me conclude my remarks by wishing our guests happiness, good luck and great success in the conference.

May I announce now the opening of the "3rd International Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019" in Payakumbuh.

Thank you.

Rector,
Prof. Tafdil Husni, SE, MBA, PhD

Welcome Message
Director of Politeknik Pertanian Negeri Payakumbuh

Dear Honorable ladies and gentlemen,

Good Morning and Assalamu'alaikumwr.wb

I congratulate to all participants on the invitation and participate at our beloved campus Payakumbuh StateAgricultural Polytechnic. I feel really honoured to welcome all of you at our event, the 3rd International Conference on Security in Food, Renewable Resources, and Natural Medicines (SFRN) 2019 at thePayakumbuh State Agricultural Polytechnic, Indonesia.

Food security is a very important aspect in a country's sovereignty. Food also determines the future direction of a nation. Many social and political fluctuation can also occur if food security is disrupted. Food availability that is smaller than its needs can create economic instability. This critical food condition can even endanger economic and national stability. In the current situation, there are many challenges in exteriorize food security, such as climate change, population, limited natural resources and other challenges both locally, regionally and globally.

Renewable resources are also our starting point to start sustainable development. Research on renewable resources is also very important as the solution in meeting the principles of sustainable development. As we know that Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainability is the foundation for today’s leading global framework for international cooperation - the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs)

The discovery of treatment based on local culture also contributes greatly to the good of humanity. Unfortunately, there are still many treatments that have not been carried out by scientific research. So, through this conferencewe hope it can be a trigger to increase in traditional plant-based treatments that not go through complex

chemical processes, so that the effectiveness of the pillars can be further suppressed and also contribute to the community's economy.

Finally, I would like to express my gratitude to all people who involved in organizing this event and to all ofstakeholders who have helped to make this event go on succesfully. Please accept my apologize for any shortage, Assalamu'alaikumwr.wb.

Thank you

Ir. Elvin Hasman, MP

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Abundance and Potential of Erionata thrax L (Lepidoptera; Hesperidae) as an Insect Vector Ralstonia syzygii subsp. celebesensis Cause of Bacterial Blood Disease in Barangan in Deli Serdang Regency North Sumatera

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Abstract. Abundance and Potential of Erionata thrax L (Lepidoptera; Hesperidae) as an Insect Vector Ralstonia syzygii subsp. celebesensis Cause of Bacterial Blood Disease in Barangan in Deli Serdang Regency North Sumatera. This study was conducted to determine the abundance of Erionata thrax and its potential as an infectious agent for Ralstonia syzygii subsp. celebesensis on Barangan plants. The research was conducted by using the survey method, taking samples of eggs, larvae, pupae, and imago E. thrax as many as 60 samples from Barangan plants in Sampali village, Percut Sei Tuan District, Deli Serdang Regency and isolation of Ralstonia syzygii subsp. bacterial. celebesensis in the Laboratory of Agriculture, Faculty of Agriculture, Medan Area University. The results showed that the percentage of E. thrax attacks on Barangan plants reached 100 percent in the rainy season. In Barangan plantations, there were found various phases of E.thrax development ranging from eggs, larvae (L1, L2, L3, L4, L5, and L6), pupae and imago. Propagul Ralstonia syzygii subsp. celebesensis is only found in E.thrax imago.

Keywords: Erionata thrax, barangan banana, Ralstonia syzygii subsp. celebesensis, imago

INTRODUCTION

E. thrax is a pest in banana plants. Almost all types of bananas can be attacked by this pest. Barangan Banana is a local Medan banana that is classified as susceptible to E.thrax attacks. In the Barangan banana plantations which were planted by the double row method in the Kelompok Tani Masyarakat Bersatu (KTMB) of Sampali Village, Percut Sei Tuan District, Deli Serdang Regency, North Sumatra Province, the E.thrax attack was found to be quite high. In Barangan banana plants, it can be found 2 - 20 larvae and pupa *E.thrax* Setiawan *et al* (2019). Various stages of development of *E.thrax* can be found such as eggs, larvae (L1-L5), pupae and imago in the Barangan banana plantations in high numbers. According to Hasyim *et al* (2003), the population density of E.thrax pests is also found in high

numbers reaching 20- 35 individuals per banana tree in a banana plantation in Surian, Solok Regency, West Sumatra Province.

The high population of *E.thrax* is thought to be closely related to the attack of bacterial blood disease in the Barangan banana plantations in the banana plantations of the Kelompok Tani Masyarakat Bersatu (KTMB) Percut Sei Tuan. Blood Disease Bacterium (BDB) was first found in Kepok banana plants at the age of 9 months after planting, while the symptoms of BDB attack on Barangan plants were found in the second generation (18 months after planting). BDB attacks were mainly found on Barangan plants that had been fruiting. Information about the role of E.trax in the distribution of BDB on Barangan bananas is still lacking in information, so research on the role of E. thrax in the distribution of BDB on Barangan banana varieties is needed.

MATERIALS AND METHOD

Methods

Determination of the study location using a purposive sampling method that is based on serious Leaf roller attacked location in Barangan banana plantations, in Sampali Village, altitude, 12 m Percut Sei Tuan District, Deli Serdang Regency, North Sumatera Province. The study was carried out from Juli to September 2018.

A sampling of Egg, Larvae and Pupa *Erionata thrax* L.

The material was collected by hand collecting from banana attacked *E.thrax* from plantation systems (Fig 1) and imago skipper by sweep net.

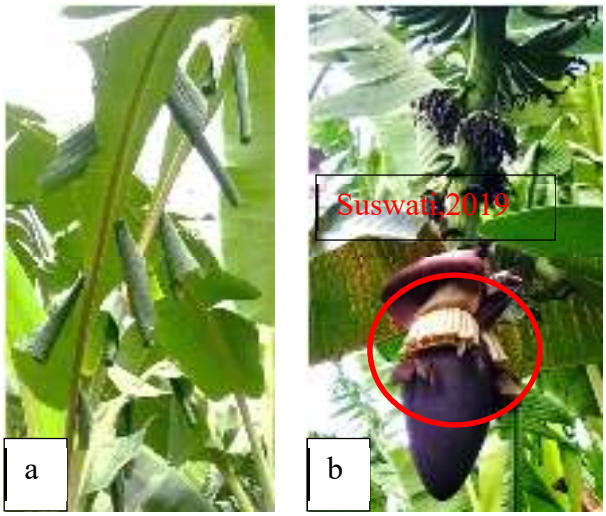

Fig 1. Banana leaf roller attacked (A) and E.thrax imago in Barangan flower (B).Suswati,2019

Every banana leaf, especially the undersides, was observed carefully to find eggs, larvae, and pupae of the banana skipper. All eggs, larvae, pupae found were then removed from the leaf to plastic bag using scissors or handpicked. All eggs, larvae, pupae, and imago are then transferred into a small plastic container in which only one specimen placed in each container.

Fig 2. The stadia of *E.thrax* .a.eggs; b. larva stage; c. pupae. Documented Suswati, 2019

A sampling of *E.thrax* Imago of Banana Flowers

Imago of ***E.thrax*** (Figure 1) was collected from a male flower of infected bananas which is attacked by BDB using insect nets (sweep net) from 09.00 to 10.00 am. Insect samples were taken from sixty of Barangan flowers sick. The collected insects were put in a box container. Each individual of imago *E.thrax* in box container with three replications was labeled and put into icebox before transported to the laboratory for BDB isolation and BDB identification.

Isolation of *R.syzygii* subsp *celebensis* from the outside of the body phase of the egg, larva, and pupa

Isolation of BDB conducted by using medium Triphenyl Tetrazolium Chlorid (TTC). Isolation of bacteria was conducted from three eggs, larva and pupa are dipped into a test tube containing 9 ml of sterile water (fig 2). Then vortex with a speed of 300 rpm. The rinse water was diluted (10^{-2} and 10^{-4}). 10 µl of each dilution was breed with the method of TTC cast on selective media, incubated at room temperature 29°C for 48-72 hours.

Isolation of *R.syzygii* subsp *celebensis* from the Outside of the Body Phase of The Imago *E.thrax* which Visit Male Flowers

Isolation of BDB conducted by using medium Triphenyl Tetrazolium Chlorid (TTC). Isolation of bacteria was conducted from three tail imago *E.thrax* as much as 1 g of each insect body parts (head and abdomen) is inserted into a test tube containing 9 ml of sterile water. Then vortex with a speed of 300 rpm. The rinse water was diluted (10^{-2} and 10^{-4}). 10 µl of each dilution was breed with the method of TTC cast on selective media, incubated at room temperature 29°C for 48-72 hours.

Identification of Pathogens in Blood Diseases

Identification carried out to ensure that the bacteria isolated from all phases of the development of the egg, larva, pupa, and imago *E.thrax* really bring BDB disease-causing blood in banana plants. BDB pure cultured used as a source of inoculums for pathogenicity tests and morphological characterization of the

properties (including shape, size, shape edging, color, and shape of the surface) and physiological (test gram reaction, pectinase enzyme test, test pathogenicity, and hypersensitivity reactions).

Observation

Population *E.thrax*.L.

The population of *E.thrax*.L. calculated based on the number of insects caught in each healthy flower and diseased plants.

Population BDB

Klement formula (Klement. 1990) was used to calculate BDB population on the sick banana flower in head and abdomen (outside), where: JB = Ax B; JB = number of bacteria, A = Number of colonies of bacteria, B = the dilution factor

RESULTS AND DISCUSSION

The population of *E.thrax*.L. in sick Barangan banana Flower

In Sampali lowland of Percut Sei Tuan District, Deli Serdang Regency, North Sumatera Province, in the endemic BDB area, it was discovered a population of *E.thrax* with high amounts of the banana flower Barangan which were affected by BDB. In one day, one sick plant of banana Barangan has been visited by 20.00 ± 5.00 individual. In the evening visit is higher than morning (10.00 ± 8.75). Based on these data, there is an increase in visiting *E.thrax* male sick flowers. This is because imago attracted by ooze dripping from the broken male flower (bacterial). This ooze contains high bacterial propagules.

BDB Insulating Phase Imago *E.thrax* who Visit Banana Flowers

On the surface of the body/body parts of insects trapped in the sick banana flower were found 100.00% positive carrying bacteria BDB bacterial. This is because of insects' activity in visiting sick banana flower was very high. In the field observations, it was found that the imago *E.thrax* moving on from sick banana flower to healthy banana flower or otherwise to seek pollen and nectar. The infected plant looks like normal from outside, these conditions enlarge the chances of the disease spreading through the insect. There is no BDB on egg, larva and pupae stadia, propagules of BDB only found inside the body of *E.thrax* imago.

Identification of *R.syzygii* subsp *celebensis*

Results of bacterial isolation from E.thrax imago in banana flower found that bacterial colony with characteristics are red-pink, with measuring 0.5-4.5 mm, irregular, convex and *non-fluidal,* with or without a pink center formation (Fig. 3). These characteristics in accordance with the characteristics of *R.syzygii* subsp *celebensis* colony description by Eden-Green(1992), Schaad *et al.* (2001) and Baharuddin B (1994).Gram test results showed that the bacterial colony found was a group of gram-negative, hydrolyze pectin. Hypersensitivity reaction test showed a positive result indicated the presence of necrotic regions in injected a suspension of

bacteria. The results of pathogenicity tests showed that these bacteria are pathogenic to banana plants with an incubation period of 3-4 days. Typical symptoms of blood disease of the whole leaf wilting occurred at 3-4 days after inoculation (hsi). These results assure that the bacterial colony is a colony of *R.syzygii* subsp *celebensis*.

Fig 3. Bacterial colony from outside body *E.thrax* imago with (a) or without a pink center formation (b)

CONCLUSION

1. The percentage of *E. thrax* attacks on Barangan plants reached 100 percent in the rainy season.
2. In Barangan plantations, there were found various phases of *E.thrax* development ranging from eggs, larvae (L1, L2, L3, L4, L5, pupae and imago).
3. Propagul *Ralstonia syzygii subsp. celebesensis* is only found in *E.thrax* imago.

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