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PROCEEDING OF THE INTERNATIONAL SEMINAR AND THE 21ST NATIONAL CONGRESS OF THE INDONESIAN PHYTOPATHOLOGICAL SOCIETY

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THE INTERNATIONAL SEMINAR AND THE 21ST NATIONAL CONGRESS OF THE INDONESIAN PHYTOPATHOLOGICAL SOCIETY

ROMOTING THE ROLE OF PHYTOPATHOLOGY BASED ON THE VANCED BIOTECHNOLOGY FOR ECHANCING THE SUSTAINABLE AGRICULTURAL PRODUCTION

Faculty of Agriculture, the University of Sebelas Maret (UNS)
Solo, December 3-5, 2011

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PROCEEDING OF THE INTERNATIONAL SEMINAR AND THE AND 21ST CONGRESS OF INDONESIAN PHYTOPATHOLOGICAL SOCIETY

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PROCEEDING OF
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PREFACE

To whom and anybody waiting for this proceeding

Firstly, Editors would like to thank to Allah SWT with "Ahamdulillahi robbil 'alamin" for everything given us bywhich the Proceeding of the Inteernational Seminar and the 21st Congress of the Indonesian Phytopathologiacl Society conducted in Faculty of Agriculture, the University of Sebelas Maret (UNS) in Solo on December 3-5, 2011 can be finished and published. The editors would like to apologize deeply for delayed publishing this proceeding. Editors understand consciously that the delayed publishing this proceeding make all of you waiting for it, to be unconfartable. In addition, Editors would like to have critical suggetions and to apologize for the delays and any wrongless related to this publication. However, Editors want hopefully that this proceeding can give much usefullness for anyreaders.

Solo, October 2014
Best Regard

Editor in Cheif
Prof. Dr. Ir. Hadiwiyono, M.Si.

REPORT AND WELCOMING SPEECH
BY
HADIWIYONO
CHIEF OF THE ORGANIZING COMMITTEE

Your Excellency:
Ministry of Agriculture, Republic of Indonesia
General Director of Food Crop Protection
Major of Surakarta
The honorable:
Rector of the University of Sebelas Maret
Dean of the Faculty of Agriculture, the UNS
All sponsorships, All Invited speakers and participants
Distinguished guests, Ladies and Gentlemen

Assalamu'alikum wr wb and Good Morning

First, allow me on behalf of Indonesian Phytopathological Saciety to express our warm regard to all participants attending this International Seminar and the 21st National Congress of Indonesian Phytopathologycal Society (21st IPS) conducted in the Faculty of Agriculture, the University of Sebelas Maret in Solo. This Seminar is jointly organized by our Department of Agrotechology and the Indonsian Phytopatological Society, Local Organization of International Association of students in Agricultural and Related Sciences (IAAS) Indonesia, Forum of Agrotechology Students (FORMAT) with the topic of" Promoting the Role of Phytopathology Based on the Advanced Biotechnology for Enhancing the Sustainable Agricultural Production".

Ladies and gentlemen, from the committee secretariat, this seminar is attended by the member of IPS, lectures and students, researchers, agricultural entrepreneurs, private and state agricultural corporations. On the first day, we will have sharing with all participants directed by 9 invited speakers, the competence expert who would deliver the advanced specific topic on phytopathology and the Ministry of Agriculture, Republic of Indonesia who would deliver the Indonesian's Policies for Sustainable Agriculture Production. On the second day, we will discuss with many report of present researches and interesting reviews grouped into some parallel classes based on interested fields of the participant.

Ladies and Gentlemen, this program can be carried out due to the valuable support from some sponsorships, therefore the committee have to thank to PT. Bank Rakyat Indonesia (Persero), PT. Bayer Sciences, PT. Mitra Kreasidarma and PT. Biotis for the financial assistance.

Ladies and gentlemen, we would like to say one more on behalf the organizing committee, welcome. Hoping we are enjoyed, get nice seminar and congress and it is a great pleasure to have you all here.

Assalamu'alaikum wr wb

Dr. Ir. Hadiwiyono, M.Si.

REMARK AND WELCOMING SPEECH
BY
ACHMADI PRIYATMOJO
SECRETARY-GENERAL OF THE INDONESIAN PHYTOPTHOLOGICAL SOCIETY

Distinguished guests and participants,

National Congress and Scientific Seminar of The Indonesian Phytopathological Society (IPS) have been held since 1970 and after that members of IPS meet again every two years in various places in Indonesia which have many unique cultures and beautiful scenery. This year in 2011, National Congress and Scientific Seminar of IPS are held in Solo City, Central Java Province. Solo is known as center of traditional culture of Java as well as center of tourism destination.

National Congress and Scientific Seminar of IPS theme is **"Promoting the Role of Phytopathology Based on the Advanced Biotechnology for Enhancing the Sustainable Agricultural Production"**. This Congress and Seminar is dedicated to the idea that persons of goodwill can come together, breathe life into a spirit of self-reliance, and enhance the experience of phytopathological works that will contribute to sustainable agriculture production. Both international and national keynote and invited speakers who will deliver and share their experiences in this seminar might give us an opportunity to enhance our knowledge. Hearing of someone else's background and experiences can often make for fascinating discoveries that can educate and profoundly affect us. Therefore take advantage of this congress and seminar of hundreds of people working in the same field to meet one another, talk with one another, and learn from one another.

The opportunity to develop and increase collaboration research by attending the congress and seminar will intensively improve. Current issues on environment and food stability should be answered soon to choose appropriate policy and technique. Biotechnology as one of the newest sciences is likely has power as tool and bridge to overcome the issues as well as phytopathology.

In this moment I would like to thank all of government and non-government institutions, private companies, and person in supporting this year IPS meeting in Solo. Special thank is also delivered to all members of organizing committee for arrangement the meeting. I would like to appreciate staff members of Faculty of Agriculture, the University Sebelas Maret (UNS).

Finally, I wish you wonderful and rewarding congress and seminar.

Secretary-General of Indonesian Phytopathologycal Society,

Prof. Dr. Ir. Achmadi Priyatmojo, M.Sgr.Ac.

REMARK AND WELCOMING SPEECH
BY
RAVIK KARSIDI
RECTOR OF THE UNIVERSITY OF SEBELAS MARET (UNS)

The honorable, Ministry of Agriculture, Republic of Indonsesia
The honorable, Director of General Directorate of Food Crop Protection
The honorable, Major of Surakarta
The honorable, Dean of the Faculty of Agriculture, the UNS
The honorable, All Invited speakers, participants, Distinguished guests,
Ladies and Gentlemen

Assalamu'alikum wr wb and Good Morning

Before all, We would like to thank to Allah SWT for the everything gift to all of us. Allow me on behalf of the University of Sebelas Maret (UNS) to express welcome and our warm regard to all participants attending this International Seminar and the 21st National Congress of Indonesian Phytopathologycal Society (21st IPS) conducted in Faculty of the Agriculture, the University of Sebelas Maret (UNS) in Surakarta.

Ladies and gentlemen, the world population is continuing to grow at a rapid rate. It rose from 3.0 billion in 1960 to 6.5 billion in 2005 – and by 2030 there will be approximately 8.3 billion people living on our planet. Supplying these people with food and other farm products constitutes a growing challenge. To make things even more difficult, whilst the needs are increasing, the amount of available farmland per capita is continually shrinking. In 2005, there was still 2,200m² (2,630 square yards) of farmland available to supply the needs of one human being. By 2030 there will only be 1,800m² (2,150 square yards).

Ladies and gentlemen, all efforts to open up new agricultural land run up against the limits of what is ecologically acceptable. Areas not being used by man contain indispensable habitats for millions of plant and other complex species, thus helping to maintain the world's ecological balance. We deal to look that wherever the agricultural land is a limited resource. This makes it more important than ever to deliver products that help growers worldwide to secure good crop yields on the land already in use.

Crop protection is therefore a key element in sustainable agriculture system (SAS) to meet increasing global demand of the farm products. The system aim to safeguard harvest yields without shrinking potential production of the farmlands, and thereby ensure that farm product remains available, affordable and of high quality for now and the futures. These products are indispensable for any form of agriculture, whether conventional or organic. By SAS, we are also acutely aware of responsibility to the environment at large. Emphasizing the plant pathogens has caused about 13.5% *crop loss* each year in the world. Therefore the role of phytopathologists is needed for the case. Therefore we hope through this seminar will emerged valuable contributes to develop of SAS, particularly from the side of crop protection from the threat of plant pathogens.

Ladies and gentlemen, before closing my speech I would like to say that the committee has done all to afford the best carrying out of the seminar and congress, however I am sure that there are so many lacking in carrying out this program and servicing you all. Therefore on behalf of the institution of UNS and the committee I would like to ask you all of to give apologize.

Assalamu'aliakum wr wb

Prof. Dr. Ravik Karsidi, M.S.

Keynote Address

MINISTER OF AGRICULTURE
REPUBLIC OF INDONESIA
AT THE OPENING CEREMONY OF
International Seminar and the 21st Conggress of Indonesian Phytopathological Society
Solo, 3-5 December 2011

Distinguished guests,

- **Researchers, Scientists, Policy Makers from International and National Institutions,**
- **Participants, Ladies and Gentlemen.**

Assalamu'alaikum warahmatullaahi wabarakaatuh,

It is a great pleasure for me to be here with you in this fine morning. On behalf of the Government of the Republic of Indonesia, it is a great honor and privilege for me to extend our warm welcome to all participants.

Ladies and Gentlemen,

First of all, let us give our highest gratitude to Allah SWT, because of His favour and blessings we could gather here today. I believe the joint conference about "Promoting the Role of Phytopathology Based on the Advanced Biotechnology for Enhancing the Sustainable Agriculture Production" is very important, because the availability of effective and economic crop protection strategies is one of key factors contributing the food security. I hope this conference will produce among others new progressive ideas on the use of advanced biotechnology in crop protection to enhance the sustainable agriculture production. The Indonesian Phytopatological Society as one of prominent scientific societies in Indonesia, together with other national components that care about food security, have ethical responsibility to continuously find solutions to enhance sustainable agriculture production.

Ladies and Gentlemen,

Agriculture in the next future will not only need to produce enough food and energy for population, but will also be the key to conserve the environment for a sustainable food production. As was agreed in the 2005 International Rice Conference held in Bali, this broader concept of agriculture was indicated as a new concept of what we had known before as green revolution, and presently it is called the evergreen revolution.

Rural poverty, unemployment and food security are the most critical issues facing Indonesia right now and for some years to come. Indonesian rural development over the past three decades shows that agriculture will continue to drive the rural economy in the next 20 years.

Today it is much harder to increase rural and agricultural productivity beyond what has already been achieved. Input levels are often already high and marginal increments in yields are declining. New approaches need to be focused on a systematic productivity-driven, rather than input-driven and agricultural growth. We need to make balance in our development program through sustainable development approach.

Sustainable development is the management of the natural resources base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable.

Indonesian history has proved that agriculture and forestry sectors were able to buffer the national economy through the economic crisis phases in 1997. In the future, agriculture sector yet become the main pillar of the country to relieve the global economic crisis that is starting to affect the developed contries.

For the period of 2010-2014, the Ministry of Agriculture has set 4 main targets of agriculture development, i.e. (1) To achieve self-sufficency and sustainable self-sufficency (2) To enhance food diversity, (3) To enhance value added, competitive advantage and export, (4) To enhance farmer welfare. Self-sufficiency has been targetted for three main food comodities, i.e. soybean, sugar, and beef. To reach self-sufficiency, we will escalate in our efforts to achieve 2.7 million tons of soybean in 2014 from 0.9 million tons in 2010, 5.7 million tons of sugar in 2014 from 3 million tons, and 0.55 million tons of beef in 2014 from 0.41 million tons in 2010.

Sustainable self-sufficiency has been targetted for rice and maize. In order the position of rice and maize self-sufficiency to be sustainable, the target of production increase must be

higher than the national demand increase. By considering some variables including the projected population growth, industrial raw material demand, national logistic need, and export opportunity,

we will increase our efforts to achieve 81.6 million tons of rice in 2014 from 66.5 million tons in 2010, and 29 million tons of maize in 2014 from 18.3 million tons in 2010.

We understand that our effort to enhance sustainable agriculture production will face many challenges, such as the conversion of agricultural land into non agricultural land, decreasing amount of arable land, pest attack, global warming causing harvest failure and global climate change that very unpredictable.

Ladies and Gentlemen,

Loss of production caused by plant diseases are very significant. The signs of the emergence of new disease in the era of global warming that are present might generally be reduced our crop production as well.

It has been shown by researchers all over the world that the advanced biotechnology offers new tools to contribute to the plant protection. The use of biotechnology tools allows the early detection of plant diseases, can accelerate the breeding of disease resistance, and allows the development of novel disease resistant varieties that can not be achieved before by using classical breeding strategies. In addition, biotechnology tools can be used to produce virus-free seedlings those can be very useful for farmers, agribussiness and other users.

Ladies and Gentlemen,

Our national target to achieve self-sufficiency and sustainable self-sufficiency is not an easy task. Collaboration between farmers, Ministry of Agriculture, researchers in various intitutes in Indonesia, seed company, fertilizer company, and other national components is an absolute need to reach the target.

For rice, blast, bacterial blight, and tungro are three major diseases limiting the sustainable enhancement of production. Downy mildew is the most important disease in maize production, whereas rust is the most important disease in soybean. Population dynamic of the pathogens causing these diseases tend to change in the field that those create challenges to develop effective and economic crop protection strategies.

The Indonesian Phytopatological Society as a scientific society engaging in the researches on the crop disease protection in Indonesia has a historical call to exploit its expertises to contribute to the achievement of national target by utilizing the advanced biotechnology tools to overcome the constraints of the enhancement of sustainable agricultural production.

These are some important points I would like to mention today. For your attention, and for the opportunity given to me, I would like to thank you all. May Allah SWT bless us during this conferenece.

Finally, with **Bismillahirrahmanirrohim, I declare International Seminar and the 21th Conggress of Indonesian Phytopathological Society** officially open. I hope you have a productive meeting and enjoy during your stay in Indonesia, especially in Solo.

Thank You

Wassalaamu'alaikum warahmatullaahi wabarakaatuh.

Minister of Agriculture,

SUSWONO

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CONCENTRATION TEST OF MATICO LEAVES (*PIPER ADUNCUM*) WATER EXTRACT FOR CONTROLLING ONION PURPLE BLOTCH DISEASE CAUSED BY *ALTERNARIA PORRI*

Nurbailis[1*], Ali Hanafiah[2], Yulia Fitri[2]
[1]Lecturer of Agricultural Faculty, Andalas University, Padang
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ABSTRACT

Research on the concentration test of matico (*Piper aduncum* L.) leaves water extract for controlling onion purple blotch caused by *Alternaria porri* had been conducted at Phytopathology Laboratory and screen house belong to Faculty of Agriculture, Andalas University. The purpose of this study was to determine the most effective concentration of matico leave water extract in controlling purple blotch disease on onion. This research used randomized blocked design with 5 treatments and 4 replications. The treatments were the concentration of matico leaves water extract namely : 0, 30, 40, 50 and 60 ml/l of distilled water. The observed parameters were: the emergence of first symptom, the percentage of symptomatic leaves and the intensity of infected leaves. The results showed that administration of matico leaves water extract with a concentration 40 ml/l of distilled water was the most effective in controlling purple blotch disease on onion.

Keywords : onion, matico, *Alternaria porri*

INTRODUCTION

Onion (*Allium ascalonicum L.*) is one of vegetables that is used as a complement and seasoning to flavor dishes. In addition, the onion can be used as traditional medicine because it contains antibiotic compounds [12]. Productivity of onion plants in West Sumatera tends to increase. In the year 2004 amounted to 7.89 tons/ha and in 2005 increased to 9.29 tons/ha [3]. Productivity is still low compared with the optimum productivity of onion by 15 tons/ha [1].

The low productivity of onion caused by various factors, one of them is *A. porri* causing purple blotch on onion. The disease intensity of purple blotch of onion in Indonesia was at the ranges 30-40%, and could reach 80% in the rainy season [13].

Control of purple blotch can be done by planting onions in fields that have good drainage, crop rotation and use of fungicides [14]. The use of fungicides in plant disease control showed satisfactory results, but on the other hand can cause problems to the environment, especially the effects of residuals. To control purple blotch is necessary to arrange a safe control alternative for the environment and consumers. One way of controlling currently being developed is the utilization of plant based pesticides. Botanical pesticides is a pesticide which essentially derived from plant material. This pesticide is relatively easy to make with the skills and knowledge are limited, it is easy to decompose in nature so it does not pollute the environment [7].

A species of plant that can be used as botanical pesticide is matico (*Piper aduncum* L). Matico leaves contain chemical compounds, among others: 0.1% volatile oil, benzoic acid (3-6 hydroxy, 3-7 dimethyl, 2-7 octadienyl) 4-methoxy benzoate. Benzoic acid derivative that had been isolated gives the activity as an antibacterial and antifungal [9]. French (1985) cit. Pasha [11] suggested that chemical compounds found in volatile oil could cause biological responses in fungi which could inhibit and suppress the growth of fungal conidia.

Ardi [2] reported that extract of matico leaves was able to suppress the growth and development of some pathogenic fungi such *Colletotrichum capsici* and *Sclerotium rolfsii*. The results of Nurmansyah's research [8] in the laboratory showed that matico leaf extract at concentration of 10% was able to inhibit growth of *S. rolfsii* isolated from peanut and chili, and *Fusarium oxysporum* .from tomato. The result of Widiastuti's research [18] by using several

concentrations of matico leaves extract (10, 20, 30, 40, 50 ml/l of distilled water) proved that concentration of 30 ml/l of distilled water was effective in suppressing the growth of the fungus *Alternaria porri* in vitro. To determine the effectiveness of matico leaves in controlling onion purple blotch disease, it is necessary to test in planta.

The purpose of this study was to determine the most effective concentration of matico leaves water extract in controlling purple blotch disease on onion.

METERIALS AND METHODS

This research was conducted at Phytopathology Laboratory and screen house, Faculty of Agriculture, Andalas University from October 2006 until January 2007.

The experiment design used was Randomized Blocked Design (RBD) with 5 treatments and 4 blocks. The treatments were the concentration of matico leaves c water extract namely: 0, 30, 40, 50 and 60 ml/l of clistilled water. Data were analyszed by using ANOVA and DNMRT at level 5 %

Isolation of Fungus *A. porri*, the source of inoculums is taken from the leaves of onion plants that were attacked by purple blotch pathogen in Alahan Panjang. Isolation of the pathogen used moist chamber method. Fungus that grew on the moist chamber isolated to PDA (Potato Dextrosa Agar) to obtain pure culture.

Conidia suspension of *A. porri* was prepared by releasing conidia growing on agar. Conidia are suspended in 10 ml distilled water. Dilution was the performed to obtain the density of 10^6 conidia/ml distilled water. For counting the number of conidia was used haemocytometer.

Matico leaves were collected from the area around Andalas University campus in Limau Manis. Leaves were weighed 500g then washed and added with 100 ml of distilled water. The leaves were pounded with a mortar until smooth and the water extract was filtered with cheesecloth. Then took appropriate treatment (30, 40, 50, 60 ml). After that each treatment was added with distilled water by which the volume 1 l, and also with 0,5 g of detergent. Onion seeding used was Thai variety derived from farmer in Alahan Panjang. The bulbs were medium sized and uniform with diameter 1.5-2 cm, brightly colored and deformed.

Soil used for growing media from the faculty of Agriculture experimental garden in Limau Manis, soil mixed with manure (3:1 v/v), stirred evely and then sterilized. Sterilization is performed using the method Tyndalization. Afterwards put into polybag 5 kg/polybag.

A bulb was planted in every polybag. Then doing maintenance namely: fertilizing, watering, and weed removal.

Treatments with several concentrations of matico leaves water extract was applied by spraying the entire plant at 15, 30, and 45 days old.

A. porri inoculation done at 21 days old plant by spraying conidia suspension with a density of 10^6 conidia/ml about 12 ml for each plant using a hand sprayer. After inoculation the plant covered with plastic bags.

Observation

Incubation Period. Observation the first appearance of symptom was gone on everyday starting one day after inoculation until the first symptom emergence characterized by small spots of white to gray.

Symptomatic Leaves. Observation of symptomatic leaves percentage starting from the first day of symptom appearance until harvest at interval of 3 days.

Disease intensity. Observations made at interval of 3 days after the appearance of the first symptom until the harvesting. Observation time along with the observation of symptomatic leaves percentage. The calculation is done using the formula:

$$I = \frac{\sum(ni \times si)}{N \times S} \times 100\%$$

where I = disease intensity, ni= number of leaves on each category of disease, si= scale value of each category of disease, N= number of leave category of disease, N= number of were observed, S= the highest scale score of category.

Table 1. Scale of purple blotch (*A. porri*) on onion

Scale	Purple Bloch	Damage (%)
0	No	0
1	Too little	> 0—20
2	Little	> 20—40
3	Moderate	> 40—60
4	Heavy	> 60—80
5	Too heavy	> 80

Source: buletin penelitian hortikultura (1994) cit. Nurita [9], modified.

RESULTS AND DISCUSSION

Treatment with various concentrations of matico leaves water ectract on onion showed significant infuence on when the first symptom emergence of purple blotch disease. Further test results can be seen in Table 2.

Table 2. Time the first symptom emergence of purple blotch disease on onion by treated by matico leaves water extract

Concentration (ml/l distilled water)	Time the first symptom emergence (dai=days after inoculation)	
C (40)	2.75	A
B (30)	2.50	Ab
E (60)	1.75	Bc
D (50)	1.50	C
A (0)	1.25	C

The mean located on the same column followed by same letters are non significantly different at the level of 5 % by DNMNRT.

The most rapid of the first symptom emergence could be found at treatment without matico leaves water extract (0 m/l) that was 1.25 days after inoculation (dai), and the slowest was treatment with matico leaves water extract 40 ml/l of distilled water (2.75 dai). Increasing the concentration to 40 ml/l of distilled water could retard the first symptom emergence of purple blotch disease on onion. Treatment with various concentration of matico leaves water extract gave real different effect on symptomatic leaves percentage of purple blotch on onion. Further's test results are presented on Table 3.

Table 3. The percentage of purple blotch symptomatic leaves on onion by treated by matico leave water extract

Concentration (ml/l distilled water)	The percentage af symptomatic leaves (%)		Effectiveness (%)
A (0)	46.875	a	0
D (50)	36.965	ab	21.14
E (60)	35.415	b	24.45
B (30)	28.075	bc	40.11
C (40)	26.183	c	44.14

The numbers located on the same column followed by the same small letters are non significantly different at the level of 5% by DNMRT.

The highest percentage of purple blotch symptomatic leaves on onion found at treatment without matico leaves water extract (0 ml/l) amount to 46.875%, while the lowest was treatment with 40 ml/l matico leaves water extract amount to 26.183% with 44.14 effectiveness. Increasing the concentration to 40 ml/l could suppress percentage of symptomatic leaves.

Treatment with various concentration of matico leaves water extract showed significant influence on the intensity of purple blotch disease. The result of further test on purple blotch disease intensity can be seen in Table 4.

Table 4. The intensity of blotch disease on onion by treatment with various concentration of matico leaves water extract

Concentration (ml/l distilled water)	Intensity of purple blotch (%)		Effectiveness (%)
A (0)	9.375	a	0
D (50)	7.393	ab	21.14
E (60)	7.085	b	24.43
B (30)	6.365	bc	32.11
C (40)	5.238	c	44.13

The numbers located on the same column followed by same letters are non significantly different at the level of 5% by DNMRT.

The highest intensity of purple blotch disease on onion was obtained in treatment without matico leaves water extract that was 9.375%. while the lowest was treatment with 40 ml/l matico leaves water extract amount to 5.238% with 44.13 effectiveness.

Discussion

Time the first symptom of purple blotch on onion appeared by treatment with various concentration of matico leaves water extrct differed significantly among treatments. In treatment A (0 ml/l) without giving maticom leave water extract, the pathogen infected plant faster compared with other treatments. This is due to the absence of compounds that can suppress the growth of pathogen. Treatment with 50 ml/l of symptom was more quickly than the treatment with 30 ml/l and 40 ml/l. This due to chemical compounds that contained too much in matico leaves water extract. Consequently the onion plant organs were damage and matico leaves water extract was no longer effectively to suppress the growth of pathogen. According to Triharso (16), too much treatment of fungicide on the plant could damage its provision of 40 ml/l of matico leaves water extract. This is due to chemical compounds contained in matico leaves water extract most effective in suppressing the growth of pathogen. Orjala et al. [10] reported that in addition to benzoic acid, matico leaves also contained carboxylic and phenolic acid, those three compound are very active to inhibit and suppress the growth of microbes such as fungi and bacteria.

Treatment with matico leaves water extract were able to reduce percentage and intensity of infected leaves. Treatment without matico leaves water extract (0 ml/l) had the highest percentage and intensity of infected leaves. It is caused by the most rapid of symptom emergence of the treatment, with the result that the pathogen infected the plant more rapidly and continued growing in plant tissue. The lowest percentage and intensity of infected leaves on the treatment was with 40 ml/l because the symptomemergence was the latest, so that the pathogen infected plant tissue more slowly. The essential oil that contained in matico leaves water extract also can inhibit and suppress the growth of fungal conidia. Heyne [5] stated that matico suggested that chemical compounds found in essential oil can cause biological responses in fungi of which can inhibit and suppress the growth of fungal conidia.

CONCLUSIONS AND SUGGESTION

On the research that has been done can be concluded that administration of matico leaves water extract with a concentration 40 ml/l of distilled water is the most effective in controlling purple blotch disease on onion. It is recommended to conduct further research on the use of matico leaves water extract to control *A. porri* purple blotch disease on the field.

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DISCOVERY OF FIVE DIFFERENT *CERATOCYSTIS* SPP. FROM *ACACIA MANGIUM* PLANTATION IN RIAU PROVINCE, SUMATRA, INDONESIA

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ABSTRACT

Acacia mangium plantations have been established mainly in Sumatera and Kalimantan Islands. During a survey of *Ceratocystis* infecting wounds on *A. mangium* plantation in Riau, several isolates resembling *C. moniliformis sensu lato (s.l)* and *C. fimbriata s.l.* were obtained. Morphological and molecular characterizations resulted in identification of five species, four of which were new to science. In the *C. moniliformis s.l.* complex, three new species were identified, described here as *C. inquinans*, *C. sumatrana* and *C. microbasis*, while in the *C. fimbriata s.l.* complex, two species were identified, namely *C. acaciivora*, which is a new species, and *C. mangenicans*, a mango pathogen previously reported in Oman and Pakistan. As mentioned earlier, the identification of the isolates was based on morphology and comparisons of DNA sequence data for the ITS, β-tubulin and Elongation Factor 1-α gene regions.

Keywords: *Acacia mangium* plantation, *Ceratocystis*, identification, wound pathogens

INTRODUCTION

In Indonesia species of *Ceratocystis* have been reported many years ago affecting many plants and trees species including *Coffea arabica* in Java caused by *C. fimbriata* previously reported as *Rostrella coffeae* [8], *Hevea brasiliensis* in Sumatra, Kalimantan and Java caused by *C. fimbriata* previously reported as *Sphaeronema fimbriatum* [1, 4]. Until recently, with the discovery of molecular phylogeny a new *Ceratocystis* species were defined and identified such as *C. polychroma* from *Syzygium aromaticum* in Sulawesi [5] and *C. tribiliformis* from *Pinus merkusii* in Sumatra [6].

Currently in many parts of the world, molecular phylogeny has been used reasonably extensively to distinguish between *Ceratocystis* isolates. Using the comparisons of DNA sequence data for the Internal Transcribed Spacer (ITS) 1 and 2 regions including the 5.8S gene of the rDNA operon, β-tubulin and Elongation Factor 1-α gene regions, the *Ceratocystis* isolates were successfully characterized. In many studies indicated that both *C. moniliformis* and *C. fimbriata* represents a species complex. Thus, isolates initially treated as a single species have been shown to represent distinct taxa. These have led to the description of numerous species in the *C. moniliformis s.l.* complex and *C. fimbriata s.l.* complex.

This study reported the discovery of five different *Ceratocystis* spp. from *A. mangium* plantation using the morphological and molecular characterizations that resulted in identification of three new species in *C. moniliformis s.l.* complex and two species in *C. fimbriata s.l.* complex, one of which was a new species.

MATERIALS AND METHODS

Disease and fungal isolates

Sample of infected trees were selected randomly in plantations and sections of discolored wood and bark were cut from the leading edges of cankers. In laboratory, *Ceratocystis* isolation was made by single spore drops technique where fungal fruiting bodies were collected directly from the diseased samples onto 2 % (w/v) Malt Extract Agar (MEA). Where no fruiting structures were visible, both moisture chamber and carrot bait techniques can be used to induce sporulation.

DNA extractions

Ceratocystis isolates were grown on 2 % MEA at 22 °C for two weeks. Using sterilized scalpel blades, the mycelium was scraped off the surface of the