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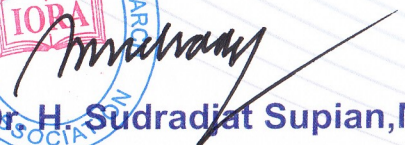
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The 3rd INTERNATIONAL CONFERENCE ON OPERATIONS RESEARCH 2018

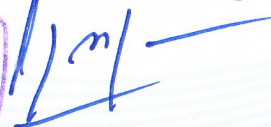
Theme: Optimal Decisions for Marine Tourism

*Which was Held at Faculty of Mathematics and Natural Sciences, Sam Ratulangi University - Manado
20-21 September 2018*

President of IORA

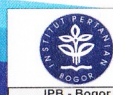

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**Dean of Faculty of Mathematics and
Natural Sciences, Sam Ratulangi University**


Prof. Dr. Benny Pinontoan, M.Sc.

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Dr. Nelson Nainggolan, M.Si.



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IORA-International Conference on Operations Research (IORA-ICOR) 2018

FAKULTAS MIPA UNIVERSITAS SAM RATULANGI



Alamat : Jurusan Matematika, Fakultas MIPA UNSRAT
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Phone 081340737994, email: icor2018@unsrat.ac.id, website: <http://icor2018.org>

Manado, 31st July 2018

Dear Parluhutan Siahaan

Thank you for your interest in The 3rd International Conference on Operations Research 2018 (ICOR 2018) and submitting your Extended Abstract entitled:

**“Evaluation of the Adaptability of Several Soybean Varieties (_Glycine max_)
due to Global Climate Change in Facing the Attack of Bean Stem Maggot,
Ophiomyia phaseoli (Diptera: Agromyzidae)”**

It is our pleasure to inform you that your paper based on your Extended Abstract **has been accepted** for presentation at ICOR 2018 on 20-21 September 2018 in Manado.
Please submit your full paper by 20th of August 2018 .
Please also note that the Deadline for Early Bird Payment is 20th of August 2018.

Please do not hesitate to contact us if you need further information.
Looking forward to your participation in ICOR 2018.

Warm Regards,
Chairman of ICOR2018

Dr. Nelson Nainggolan, M.Si



International Conference on Operations Research

3th

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OPTIMAL DECISIONS FOR MARINE TOURISM

Sam Ratulangi University, Manado, Indonesia
20 – 21 September 2018

Book of Abstracts



The 3rd ICOR 2018

Operations Research (OR) had become powerful decision making tools worldwide. In its use, Management Science (MS) is used as another term for OR. Concept of OR is borderless as it can be derived from various discipline such as Mathematics, Statistics, Economics, Engineering, Marine Science, Social, etc. to make a new set of knowledge for decision making. Today, OR has become a professional discipline which deals with the application of scientific methods in decision making theory.

The scope of OR can be used to find best solution for both simple and complex problem. It is beneficial in every aspect of human life regarding resources optimization. OR is widely used in important and main fields such as national planning and budgeting, transportation, education, agriculture, and marine management. Therefore, research and study involving OR are inevitable.

Number of research and study about OR or using OR as tools is high these years. This is accommodated by Indonesian Operations Research Association (IORA) IORA as one of OR organisations in an annual international conference entitled International Conference on Operations Research (ICOR). ICOR 2018 is the third conference. This initiates to bring together OR/MS researchers, academicians and practitioners, whose collective work has sustained continuing OR/MS contribution to decision-making in many fields of application. It can be considered as good platforms for the OR/MS community, particularly in Indonesia, to meet each other and to exchange ideas.

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WELCOMING SPEECH
The 3rd International Conference on Operations Research 2018

Minister of Marine Affairs and Fisheries of Indonesia Susi Pudjiastuti or Representative.
Governor of North Sulawesi, Indonesia Olly Dondokambey, S.E.
Rector of Sam Ratulangi University Prof. Dr. Ir. Ellen Joan Kumaat, MSc, DEA.
IORA President and Dean of FMIPA University of Padjadjaran Prof. Dr. H. Sudradjat Supian, MSc.

Distinguished Guests, Ladies and Gentlemen.

On behalf of ICOR 2018 Organizing Committee, I would like to Welcome you all and thank you for being here. Especially to Rector of Universitas Sam Ratulangi for fulfilling our invitation and to give opening speech for this conference. Special thanks also for Keynote Speakers, Plenary Speakers, Contributed Speakers and All Participants of this conference.

This conference can be held in collaboration of Indonesian Operations Research Association (IORA) and Faculty of Science Universitas Sam Ratulangi.

The point of this conference is to provide a perfect event for researchers, academics, and practitioners of Operations Research, to share experience, build communication and network with experts from all over the world. Furthermore, this conference is aimed at promotion and spread of scientific operations research field in Indonesia through Indonesian Operations Research Association (IORA).

The same conference had previously been held twice, initially hosted by Universitas Pakuan Bogor, and followed by Universitas Terbuka Tangerang as second host. This conference is now held at Universitas Sam Ratulangi Manado for the third time, that is why it is known as the 3rd International Conference on Operations Research (ICOR) under a main theme entitled Optimal Decisions for Marine Tourism.

Number of participants of this conference are more than 200, from 9 countries. Selected Papers will be published on scopus indexed IOP Publications.

Lastly, we want to gratefully thank again rector for her help and support, all keynote speakers, plenary speakers, contributed speakers, all participants, and all organizing committee who have given contribution to make this conference happen.

Dr. Nelson Nainggolan, MSi
Conference Chair

FOREWORD

Welcome to Universitas Sam Ratulangi, welcome to The 3rd International Conference on Operations Research (ICOR) organized by the Indonesian Operations Research Association (IORA) and the Faculty of Mathematics and Natural Sciences, Universitas Sam Ratulangi.

The theme this year is *Optimal Decisions for Marine Tourism*. This theme is based on the fact that Indonesia is a maritime country as well as tourism is targeted to be the prime mover of the country development and that Operations Research is relevant and essential knowledge to apply to these areas.

We have more than 200 participants registered, which shows a wide range of interests on this topic. Hopefully all papers can be published in the IOP Proceeding indexed in Scopus.

It is a great honor for us to organized this event. We thank IORA for appointed us and for the collaboration which I believe will be a door that open to more collaborations with more partners in the future. We get full support from and therefore we thank the Rector of Universitas Sam Ratulangi and the Governor of North Sulawesi Province.

Finally, we welcome you to Manado, for many of the participants maybe still long destination, but we hope that during your stay you will enjoy and take advantage of the many sights to see in the city and also experience wonderful moments in and on Bunaken Island as well as the many natural wonders in the surrounding areas.

Pakatuan wo Pakalawiden. God bless you.

Faculty of Mathematics and Natural Sciences, Universitas Sam Ratulangi.
Dean

Prof. Dr. Benny Pinontoan, M. Sc.



CONGRATULATORY SPEECH BY THE PRESIDENT OF THE INDONESIAN OPERATIONS RESEARCH ASSOCIATION (IORA)

Distinguished Guest, All invited Speakers, Participant, Ladies and Gentlemen,

It is great pleasure for me On behalf of the Association of the Indonesian Operations Research Association, I would like to welcome you all at this special event International Conference On Operations Research at the Universitas Sam Ratulangi. This event is the third event for IORA-ICOR and congratulations to the Universitas Sam Ratulangi be able to host and also thanks to the minister of maritime affairs and fisheries and Manado Provincial Governor.



The theme of the conference, Competing in the era of analytics, reflects our belief that many future challenges in our life need involvement of operations research and typical analytic operations research. Our future and our capacity to reach sustainable development goal such as ensure availability and sustainable management of water and sanitation for all; ensure access to affordable, reliable, sustainable and modern energy for all; take urgent action to combat climate change and its impacts; end poverty in all its forms everywhere; conserve and sustainably use the oceans, seas and marine resources for sustainable development; end hunger, achieve food security and improved nutrition and promote sustainable agriculture, ensure healthy lives and promote well-being for all at all ages, and other challenges require the advances the roles of operations research in collaboration with other disciplines. Operations Research is the application of scientific & mathematical methods to the study & analysis of problems involving complex systems. Analytics is defined as the scientific process of transforming data into insights for making better decisions.

Operations research is multi discipline therefore Interaction with other fields of science is indispensable and proven to have given rise to new areas that improve the ability in decision making and techniques used are modeling.

Typically, applications of Operations Research in these and other areas deal with decisions involved in planning the efficient allocation of scarce resources - such as material, skilled workers, machines, money and time - to achieve stated goals and objectives under conditions of uncertainty and over a span of time. Efficient allocation of resources may entail establishing policies, designing processes, or relocating assets. OR analysts solve such management decision problems with an array of mathematical methodologies. Completely of the operations research field can be seen in AMS 2000 or MCS 2010.

And now, I need to clarify that IORA is new association in Indonesia he is beginning piloted in workshops in Operations Research and Optimization modelling on June 4, 2011 in the Department of Mathematics Faculty of Mathematics and Natural Science, Universitas Padjadjaran, then be disseminated to several universities, government and industry.

IORA is a container that provides a forum for scientists Operational Research and to expand our horizons through the exchange of knowledge and application technology, IORA established on August 25, 2014 by deed of Notary Number 42 and the Minister of Justice and Human Rights Number. AHU-00439.60.10.2014.

IORA members came from a variety of fields, education, Researcher, government, industry, practitioners etc, in 2017 members numbered 130 members and until now IORA members numbered 240 members, and we wait for those who have become members through www.iora.or.id.

Ladies and gentlemen,

We need to inform that at the current conference will also be held meeting IORA board.

Finally, Have a nice International Conference on Operations Research. I hope there are plenty of benefits we can share and empower through this and hopefully your participations and contributions will make this conference a productive and successful one.

President, The Indonesia Operations research Association

Prof. H. Sudradjat SUPIAN, M.Sc., PhD

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Evaluation of the Adaptability of Several Soybean Varieties (*Glycine max*) due to Global Climate Change in Facing the Attack of Bean Stem Maggot, *Ophiomyia phaseoli* (Diptera: Agromyzidae)

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ABSTRACT

One of the constraint factors in increasing soybean production is the problem of bean stem maggot, *Ophiomyia phaseoli* (Diptera: Agromyzidae). One effort that can be done to overcome this armyworm is to look for soybean varieties that can adapt to the environment in North Sulawesi and have resistance to bean stem maggot attacks. The purpose of this study was to find and test soybean varieties that were able to reduce the preference and attack of bean stem maggot on these plants. There are 3 varieties to be tested, namely willis, anjasmoro, and gepak ijo varieties. The parameter that will be measured in the preference test is the number of larvae that choose each given variety. Parameters measured for testing the level of attack are the number of leaves and leaf area eaten by bean stem maggot in each variety. The experimental design used CRD (completely randomized design) and analyzed with Anova (analysis of variance) which was then tested with the LSD (least significant difference) test if there is variation between treatments. After conducting the research, the results of the preference test showed that the Anjasmoro variety had the smallest number of larvae, namely an average of 6.4 which was significantly different from the larvae found in the Willis variety, which was an average of 7.6 larvae and also significantly different from the Gepak ijo variety which had the average number of larvae was 9.2 larvae. The results of the attack intensity test showed that the Anjasmoro variety had the smallest attack intensity, which was an average of 28.02% but was not significantly different from the attack intensity found in the Willis variety, which was an average of 16.46%, but these two varieties were significantly different from the attack intensity of the Willis variety. Gepak ijo which has an attack intensity of 52.68%. Based on the results of this research, the soybean that can be suggested for planting by farmers is the Anjosmoro variety because it has a lower level of preference than the Willis and Kepak ijo varieties and also has a lower intensity of attack than the green kepak variety.

Keywords: *Ophiomyia phaseoli*, resistance, soybean.

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Parluhutan Siahaan

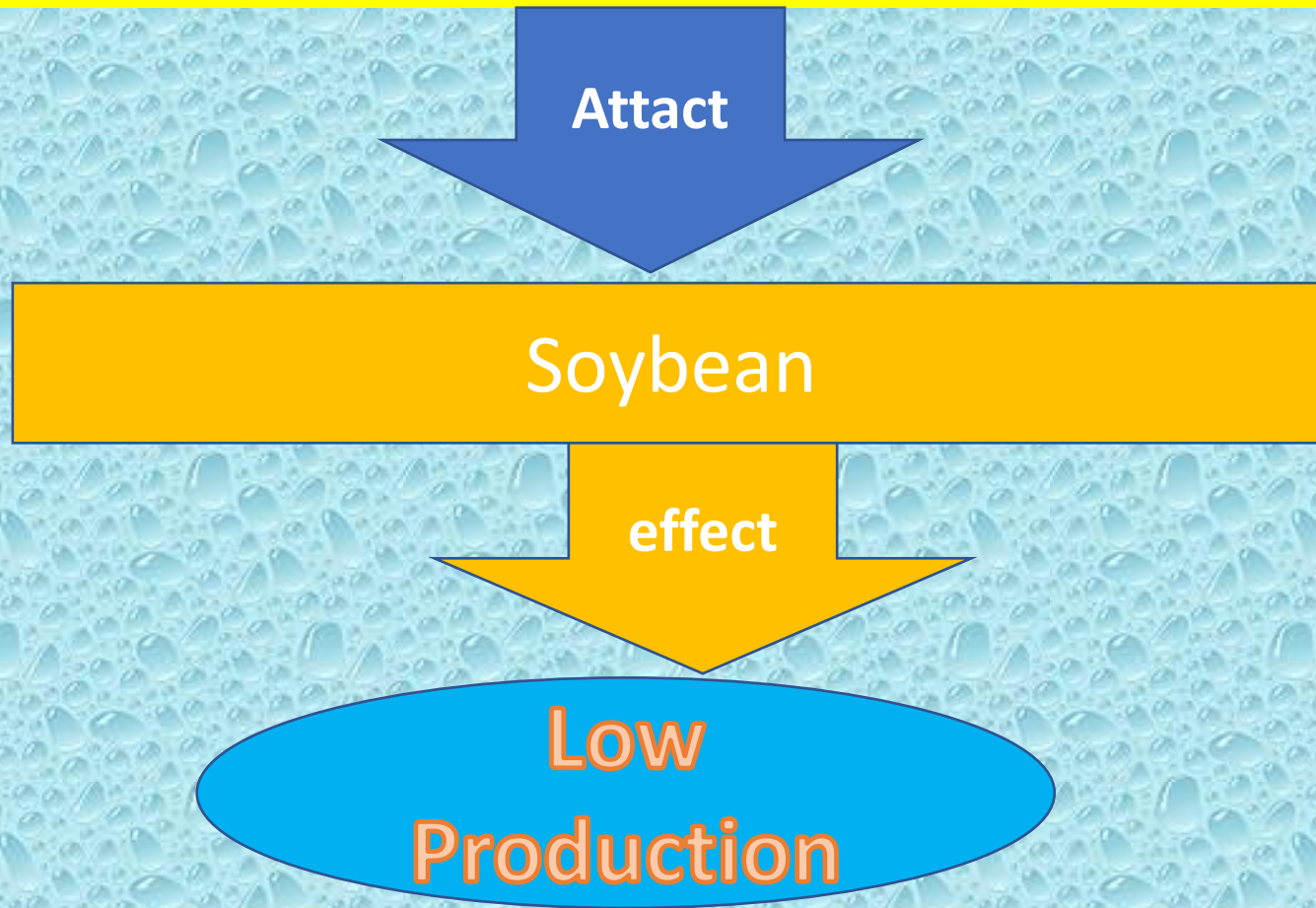
Saroyo

Marnix Langoy¹

Manado, Indonesia, September 20-21, 2018

Introduction

- Problem of Bean Stem Maggot, *Ophiomyia phaseoli* (Diptera: Agromyzidae)



Introduction

Low
Production

Management

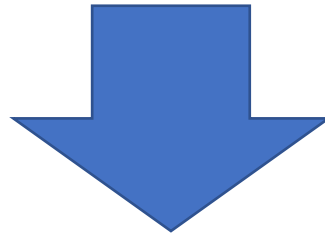
IPM= Integrated Pest Management

To look
for

Plant resisitant

Purpose

- **to find and test soybean varieties that were able to reduce the preference and attack of bean stem maggot on these plants.**



3 varieties to be tested, :

- willis,**
- anjasmoro,**
- gepak ijo**

Method

- The parameter that will be measured in the preference test is the number of larvae that choose each given variety.
- Repeatability: 5 X
- Number of insects : 20/plant
- Parameters measured for testing the level of attack are the number of leaves and leaf area eaten by bean stem maggot in each variety.
- The experimental design used CRD (completely randomized design)
- Analyzed with Anova (analysis of variance)
- Tested with the LSD (least significant difference) test if there is variation between treatments.

Results

The number of larvae that attack soybean plants

Varietas	ulangan 1	ulangan 2	ulangan 3	ulangan 4	ulangan 5	Rata-rata	SD
Willis	7	6	8	9	8	7.6	1.14
Anjasmoro	6	7	8	5	6	6.4	1.14
Gepak Ijo	9	8	9	10	10	9.2	0.84

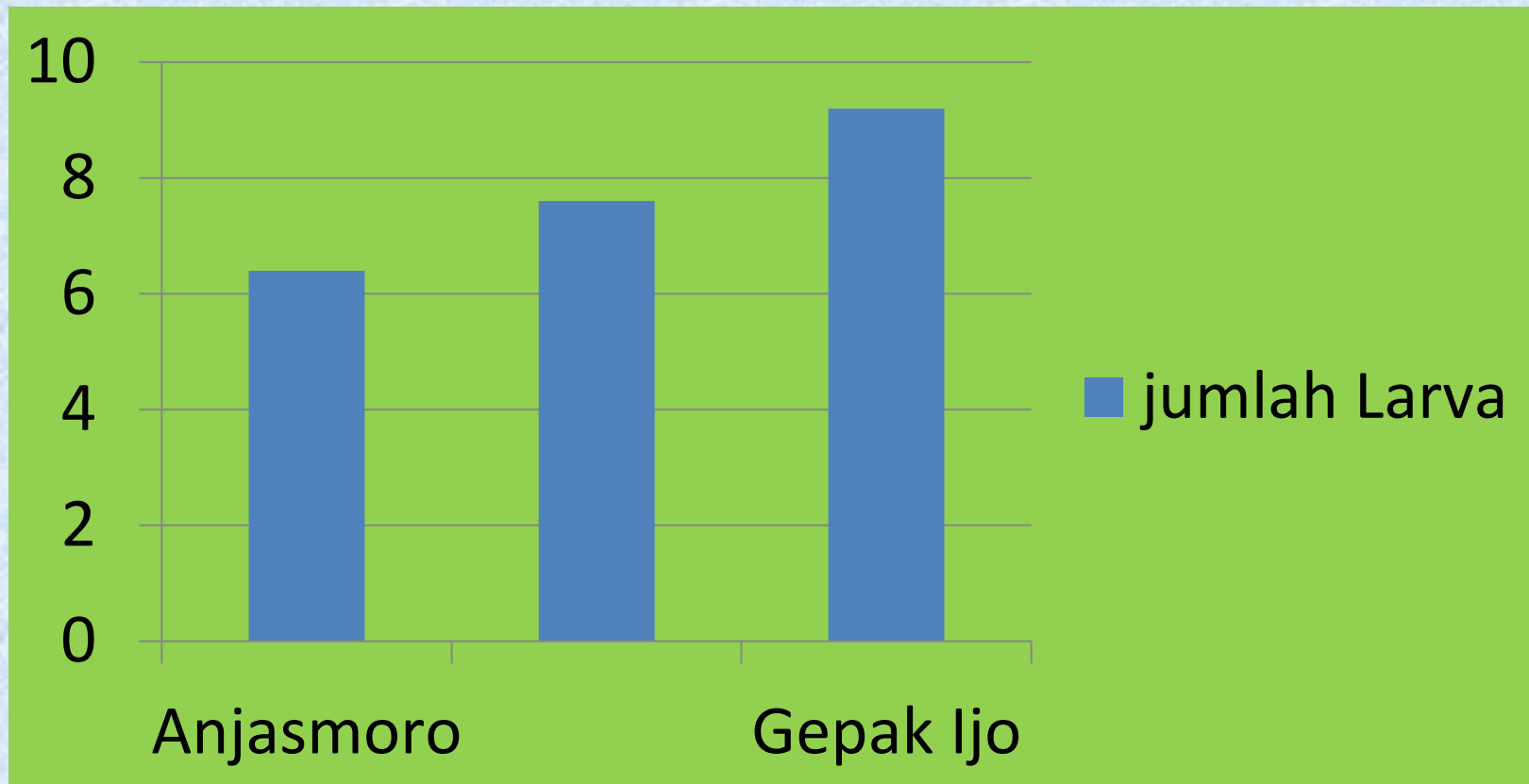
Analysis of Variance in the number of larvae that attack soybean

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Willis	5	38	7.6	1.3
Anjasmoro	5	32	6.4	1.3
Gepak Ijo	5	46	9.2	0.7

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	19.73333	2	9.866667	8.969697	0.004146	3.885294
Within Groups	13.2	12	1.1			
Total	32.93333	14				

Results



the number of larvae that attack soybean leaves

Results

Varietas	ulangan 1	ulangan n 2	ulangan n 3	ulangan n 4	ulangan n 5	Rata- rata	SD
Willis	20.6	25.9	30.5	22.9	40.2	28.02	7.75
Anjasmoro	10.7	20.2	25.1	10.8	15.5	16.46	6.22
Gepak Ijo	40.7	60.5	70.6	50.7	40.9	52.68	12.93

Perlakuan	Rata-rata	notasi
Willis	28.02	a
Anjasmoro	16.46	a
Gepak Ijo	52.68	b

Intensity of Ophymia insect attack on 3 soybean varieties

Conclusion

- The anjasmoro variety had the smallest number of maggots, namely an average of 6.4 which was significantly different from the maggot found in the Willis variety, which was an average of 7.6 maggots and significantly different from the Gepak ijo variety which had an average number of maggots as much as 9.2 maggots