USE OF SEX PHEROMONES FOR CONTROL OF PEST SWEET POTATO WEEVIL OF CILEMBU SWEET POTATO IN SUMEDANG DISTRICT

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Abstract
Sumedang is a sweet potato producing area which is better known as the cilembu test, but in its develop there are still obstacles, especially the boleng pest which can cause yield losses of up to 90 percent. Control efforts carried out by conventional farmers using pesticides are still not able to overcome these problems, so the introduction of the use of sex stimulants, better known as pheromones. The research objectives: (1) describe the level of pheromone adoption, (2) analyze the factors that influence adoption,
(3) formulate a strategy to increase adoption. Survey research through direct interviews with respondent farmers as many as 82 people who were determined using the Yamane formula from 101 people from five villages. Collecting data using a questionnaire containing a statement of each parameter of the variable; function of farmer groups (X_1), innovation attributes (X_2), and agricultural extension (X_3). The collected data were analyzed in two ways; descriptive statistics to explain the performance of variables and multiple regression analysis to find factors that influence adoption. The results of the study found; sex pheromone adoption is low, pheromone adoption is influenced by group function as a production unit and complexity as an attribute of innovation, the strategy to increase pheromone adoption is to increase the intensity of extension activities by citing materials related to the technical use and benefits of pheromones in cilembu sweet potato farming.

Keywords: Adoption, Sex pheromone, Sweet potato weevil, Multiple Regression.

1. INTRODUCTION

West Java is the highest sweet potato producing area in Indonesia with production in 2018 of 547,879 tons [1]. One of the well-known sweet potato-producing areas in West Java is Sumedang District which produces a typical sweet potato which is better known as Cilembu sweet potato. Cilembu Sweet potato has certain characteristics so that itgets a Geographical Indication certificate. Cilembu sweet potato cultivation centers in Sumedang District are located in several sub-districts, namely: Pamulihan, Tanjungsari, Rancakalong, and Sukasari.

The main challenge faced by sweet potato farmers is the quality problem of Cilembu sweet potato because it is often attacked by sweet potato weevil (*Cylas formicarius*) which may reduce yields up to 90 percent [2].

So far, in controlling the sweet potato weevil, farmers have only relied on irrigation techniques so that they have not succeeded in overcoming this sweet potato weevil

attack. Therefore, an alternative control was carried out using a decoy agent of sweet potato weevil known as a pheromone. This pheromone is a synthetic substance that contains female sex elements to attract male sweet potato weevil to approach, but if the male is lured and enters the trap, the male will die. However, the success of theeffectiveness of this method is influenced by several things, including cropping patterns and cultivation techniques, therefore an in-depth study is needed regarding the use of these sex pheromones. The aims of the study were to describe the level of pheromone adoption for controlling sweet potato weevil (*Cylas formicarius*) of Cilembu sweet potato plantations, to find factors that influence pheromone adoption, and to find strategies to increase sex pheromone adoption in Cilembu sweet potato plantations.

2. LITERATURE REVIEW

Braun AR, dan Van De Fliert E [3] in a report entitled *Evaluation of the impact of sweetpotato weevil (Cylas formicarius) and of the effectiveness of Cylas sex pheromonetraps at the farm level in Indonesia* stated that the use of sex pheromone traps can reduce crop damage. Furthermore, it is explained that the use of sex pheromones is by inserting pheromone liquid into a trap container in the form of a plastic bottle or jar thatis deliberately shaped so that male insects that enter are difficult to get out of the trap and will eventually die.

Effendy and Gumelar [4] in a study of the Adoption level of the use of organic fertilizer for lowland rice in Cikoneng Sub-district Ciamis have proven that the attributes of an innovation determine farmers to accept or apply the innovation. Furthermore, Effendy
[5] with a study entitled The Role of Institution and Innovation Attributes in the Adoption of Integrated Crop Management Technology of Lowland Rice of West Bandung and Sumedang Districts concluded that: adoption is determined by the complexity of innovation, meaning the more complex or the higher the difficulty level of innovation, thelower the adoption rate.

Based on observations and Focus Group Discussions (FGD) at the level of the Agricultural and *Food Security Service Technical Implementation Unit* (UPTD) Rancakalong, there is a phenomenon at the farmer level that the sex pheromone innovation that has been disseminated has not been successful in getting attention so that the adoption rate is relatively low.

Based on the description above, a framework is built that describes the variables thatare related to one another as well as influence the adoption of sex pheromones in controlling sweet potato weevil in sweet potato plantations. A variable that is predicted to have an effect (X) consists of; Farmer groups, attributes of innovation, and the role of extension workers. A farmer group is a collection of farmers who the same problem and needs, thus they form a forum to overcome common problems based on cooperation. Farmer groups have a function; as a place for group learning, a vehicle for cooperation, and a production unit [6]. Furthermore, the attribute of innovation as a hallmark of an innovation will speed up or slow down farmers to make decisions, the more attractive it is, the more likely it is for an innovation to be adopted. The innovation attributes consist of: relative advantage, complexity, compatibility with local conditions (compatibility), can be tried on a small scale (trial ability), can be observed (observability). Extension is a

learning process for farmers, the more intense the extension activities, the greater the farmers' understanding of an innovation, as well as the more appropriate the innovation to the needs of farmers, the greater the chance for the innovation to be adopted by farmers. Extension indicators consist of; the role of extension workers, extension materials, extension methods, and extension media.

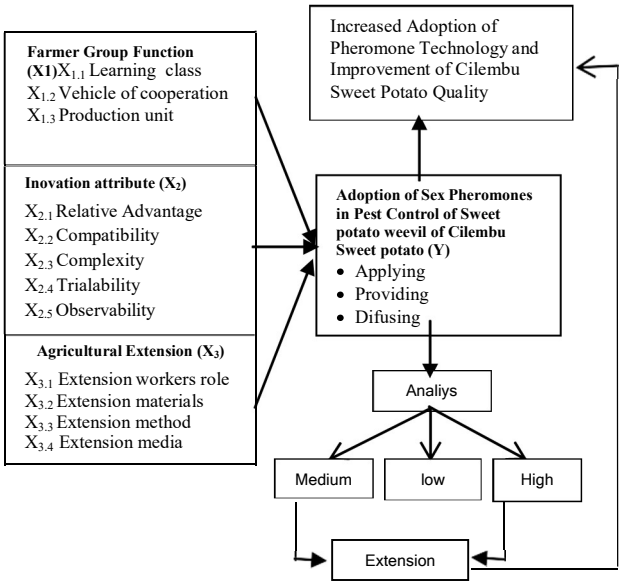


Figure 1. Research Framework Determination Factors of Adoption of Sex Pheromones in Pest Control of Sweet potato weevil of Cilembu Sweet potato

3. RESEARCH METHOD

This research is a type of survey research to explain the causal relationship betweenone variable and another variable. According to the approach used, it is quantitative research supported by qualitative data. The research location was determined purposively with the consideration that the location was the Cilembu sweet potatoproduction center in Sumedang District, West Java.

Determination of the population using the purposive sampling method, which is a sampling technique that is adjusted to certain criteria. The population obtained was 101 farmers and the sample were determined following the Yamane's formula and found a sample of 82 farmers.

The data collected consists of primary data and secondary data. Primary data were obtained directly from respondents by structured interviews using questionnaires, while secondary data were obtained from observations and literature studies. Before being used for data collection, the questionnaire was tested for validity and reliability.

The data collected were analyzed descriptively with multiple linear regression inferential analysis. The formulation of the strategy to increase adoption is pursued by formulating

the results of descriptive analysis and multiple linear regression analysis. The data processing is assisted by Microsoft Office Excel 2010 and assisted by Statistical Package for the Social Sciences (SPSS) version 26. The steps of tests are as follows:

1. Statistical testing was initiated by testing the validity and reliability of research data, aiming to determine the accuracy and reliability of the data collection tool (questionnaire).
2. The adoption rate was analyzed using descriptive analysis, by tabulating the data and then calculating the average of the total questions on each indicator. Theassessment of each question was obtained based on the respondents' answers, which are closed questions with a choice of scores of 1 to 4. The average results were then added up and divided into three categories, namely low, medium and high.
3. The primary data obtained was transformed into interval data using MSI (Method of Successive Interval). The data transformation steps were; a). Calculating the frequency, b). Calculating the proportion, c). Calculating the cumulative proportion, d). Calculating the value of z, e). Calculating the density F(z), f). Calculating the scale value, g). Calculating the value of the scaling result.
4. The transformed data was tested with the classical assumption test so that the prediction model produced is BLUE (Best Linear Unbiased Estimation). Classical assumption test consists of: a). Linearity Test, b). Normality Test, c). Multicollinearity Test, and d). Heteroscedasticity Test.
5. Data that have met the classical assumption test were tested for the Goodness of Fit Test in the form of; a). Regression Equation Model, b). Coefficient of Determination, c). Overall Test (Test F), and d). Partial Test (t-test).

4. RESULT AND DISCUSSION

4.1. Research Area Performance

The selected areas as research locations are five villages in Rancakalong Sub-District. This sub-district is one of the areas of Sumedang District which administratively consistsof 10 villages, 30 sub-village, 83 RW (hamlets), and 271 RT (Neighborhood) and are divided evenly into 64 farmer group areas. The boundaries of the Rancakalong Sub- district are in the west by Tanjungkerta and Tanjungmedar sub-districts, in the south by Pamulihan and Tanjungsari sub-districts, in the east by North Sumedang and South Sumedang sub-districts and in the west by Subang and Bandung districts. The totalarea is 5228 hectares consists of 4579 hectares of agricultural land (87.6%), 1178 hectares of rice fields (22.5%), and dry land with an area of 1779 hectares (34%). On the other hand, Rancakalong District is also one of the sub-districts mandated as a center for the development of Cilembu sweet potato with a harvested area of 501 Haand average productivity of 124.97 quintals per hectare.

The five villages used of research locations were the villages with the largest Cilembu sweet potato planted area and endemic areas for the sweet potato weevil, namely:

Pamekaran, Pasirbiru, Rancakalong, Sukasisrna, and Nagarawangi villages. The five villages that were used as research locations were the villages with the largest Cilembu sweet potato planting area and areas that were endemic to sweet potato weevil. The farmer groups that acted as respondents in this study contributed 26.7 percent of the planted area of cilembu sweet potato in the five research villages.

4.2. Variable Description

4.2.1. Functions of farmer groups

In general, the respondent agreed that the function of the farmer group as a learning class and a vehicle for cooperation was in the moderate category (49% and 56%), while the function of the group as a production unit was in a low category (54%). The performance of farmer group functions is presented in Figure 2.

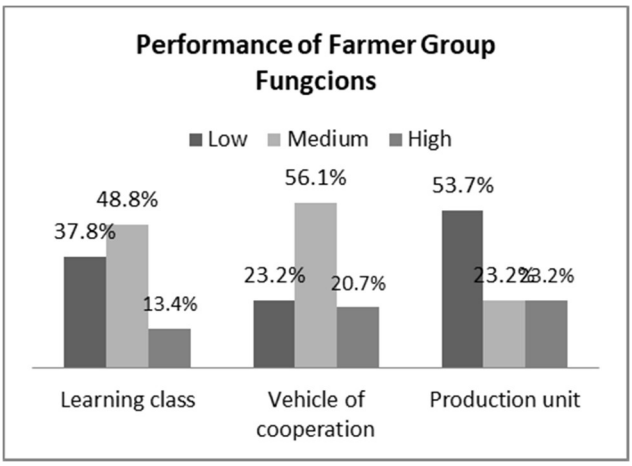


Figure 2. Performance of Farmer Group Functions

Figure 2. Shows that the function of farmer groups as production units, most respondent farmers (54%) state that they are in a low category, which means they agree that the function of groups as production units has not been running properly so efforts are needed to improve this function. Likewise, the function of the group as a learning class and a vehicle for cooperation, most of the respondent farmers agree that it is categorized as low, which means that the two functions have not satisfied them so they still need to be improved. Meanwhile, the existence of a group is expected to help its members in overcoming the problems that occur to them. This result is in line with the results of research by Effendy and Apriliani [7] which concluded that farmers agree that the function of the learning class has not functioned as it should. The purpose of a group, namely to improve the ability of members is not as expected. In other words, the function of the farmer group as a learning class is only interpreted as a routine meeting, even though it should be a means to increase the knowledge and capacity of group members.

The results of the descriptive analysis showed that most of the farmers (56.1%) agree that the function of the group as a vehicle for cooperation is categorized as moderate, which indicated that the function of the farmer group was still not satisfactory to the

farmers so that it still needed to be improved. The function of the group as a vehicle for cooperation should be optimized to improve group performance in supporting group progress. Through cooperation within or between groups, farming run by members is expected to be more efficient and able to face threats, challenges, and obstacles, to increase profits. In line with Effendy [5] farmer groups are important factors in the innovation adoption process in addition to extension institutional factors and the attributes of the innovation itself.

The results of the analysis showed that most of the respondent farmers (53.7%) categorize that the function of farmer groups as a production unit is still low. This indicates that farmers agree that the farmer group has not yet functioned as a production unit or that the farmer group has not functioned as a business unit to increase the income of its members. This condition may be because the awareness of farmers about the existence of farmer groups as a business unit to achieve a more economic scale of business has not grown as expected. The results of in-depth discussions with several farmers showed that they thought that the production produced on their land was not tied to the farmer group, even though they realized that the farmer group provided them with easy access to production inputs. So that the marketing method for cilembu sweet potatoes is still individual and monopolized by middlemen, farmers do not have bargaining power in determining prices, this is because farmers' understanding of the function of groups as production units is still low.

4.2.2. Innovation attribute

The results of the descriptive analysis of innovation attributes show that all innovation attributes are rated by most respondent farmers in the medium category, except for the observability trait which is rated high by respondent farmers. Details of the performance of the innovation attributes are presented in Figure 3.

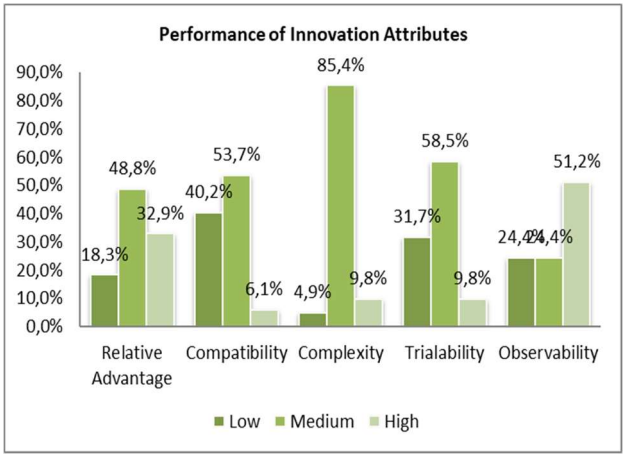


Figure 3. Performance of Innovation Attributes

Figure 3 shows that almost all innovation attributes are rated in the medium category by most respondent farmers, except for the observable attribute of innovation or ease of observation, the results of an innovation are rated high by most respondent farmers. An

innovation that will be accepted or adopted by farmers should have severalcharacteristics as consideration for accepting or rejecting the innovation. Farmers will accept an innovation if it provides benefits, is suitable for local conditions, has a low level of complexity or is simple to implement, can be piloted on a small scale, and the results can be observed.

This study found that the characteristics of innovation whose results can be observed (observability) are rated the highest by the majority (51%) of respondent farmers. These results can explain that the performance factor or the work of innovation is the main consideration for respondent farmers to adopt sex pheromones for sweet potato weevil control in their Cilembu sweet potato plantations. This result is in accordance with Rogers [8] which states that innovation will be accepted by the community if the results of the work of innovation can be seen immediately. This result has also been supported by Effendy and Gumelar [4] on the adoption of organic fertilizers which concluded that adoption is determined by the observability of the process and results of an innovation. While attributes such as relative advantage, level of difficulty (complexity), compatibility with local conditions (compatible), can be tried on a small scale (trialability), and can be observed (observability), efforts are still needed to be improved in accordance with the requirements of innovation [8].

The relative advantage is categorized as moderate with a percentage of 48.8 percent, this indicates that the respondent farmers have not yet felt any economic benefits from the use of sex pheromones on their farms, while according to Rogers [8] the greater the benefits felt by the adopter, the faster innovation is adopted. The results of in-depth interviews with farmers reinforce the reason that sex pheromones are new so that information related to pheromones is still very lacking. Meanwhile, Rogers [8] suggestedthat innovation can be compatible or incompatible, it could be caused by the sociocultural values and beliefs of the community, the adequacy of information onpreviously introduced ideas, and the need for innovation.

Complexity is categorized as moderate by most (85.4%) respondent farmers, meaning that almost all respondent farmers agree that the level of complexity or complexity of an innovation determines whether the innovation is accepted or not. Based on the resultsof discussions with several farmers, sex pheromones are a new thing, even though they received information that pheromone innovations are simple and easy to use, but theydo not fully believe it because of the information obtained still cannot convince them. As stated by Rogers [8], every new idea needs to be socialized so that potential adopters understand correctly the idea or innovation. This is in line with the results of research by Effendy and Rusmono [9] which concluded that complete information is needed before adopters decide to accept or reject an innovation.

Trialability is categorized as moderate by most (58.5%) respondent farmers, this indicates that sex pheromones can be tested with limited land or individual farmers' land. Rogers [8] also explained that personal trials can remove uncertainty about a new idea; If innovation can be designed so that it can be tried more easily, then the rate of adoption will also be faster. This is in line with the results of research by Effendy and Rusmono [9], Effendy et al [10] that concludes that one of the most important

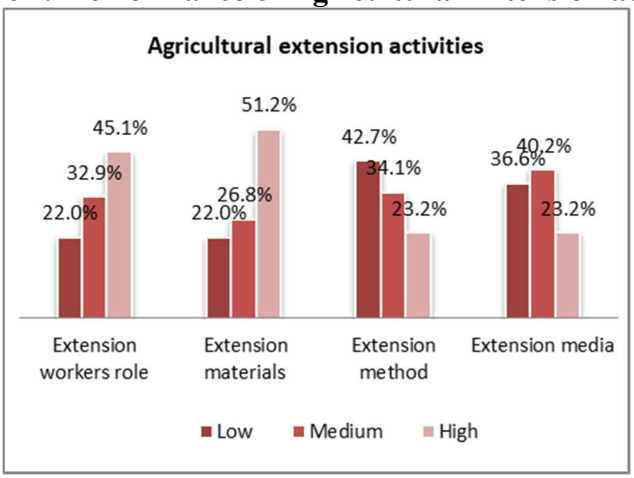
characteristics that determine the innovation can be accepted is the ease of trial on a small scale and has the characteristics of simplicity.

The innovation observability attribute is categorized as high by most respondent farmers(51.2%). These results indicate that the pheromones for controlling the sweet potato weevil of Cilmebu sweet potato can be observed both in process and in results. This situation supports Rogers [8] that observability is an important requirement for innovation to be accepted or not by prospective adopters. This result is also in line with Effendy and Leilani [11] who concluded that observability determines farmers' preferences in the adoption of integrated crop management.

4.2.3. Agricultural extension activities

The results of the performance analysis for agricultural extension activities show that there are variations in the assessment of activities by respondent farmers. The role of extension workers and extension materials was assessed by most of the farmers (45% and 51%) as high category. Meanwhile, most respondent farmers (43%) rate the extension method as low, while the extension media is considered moderate by the majority (40%) of the respondent farmers. In detail, the performance of agricultural extension activities is presented in Figure 4.

Figure 4. Performance of Agricultural Extension activities



The results of interviews with farmers and field observations showed that the role of extension workers is categorized as high by most of the respondent farmers (45.1%)this proves that the existence of extension workers is very useful for farmers in the adoption process. In line with the research of Ulfa and Sumardjo [12] stated that the ability of the extension workers in mastering the extension material determines the success of the transfer of innovation to the audience. Likewise, Ardita et al [13] stated that the role of agricultural extension workers as agents of change to encourage and help farmers through behavior change is very important. Extension activities can increase the capacity of farmers so that they are able and willing to accept the recommended innovations [9].

The extension material is categorized as high by most of the respondent farmers (51.2%). These results prove that pheromone innovation is the material needed by

respondent farmers to overcome the problems they face, namely pest attacks on sweet potato plantations. This is in accordance with Effendy et al [10] which concluded that theextension materials should be in accordance with the needs of farmers and based onthe problems faced by farmers. The more appropriate the extension material is to the needs of farmers, the greater the level of acceptance of the material by farmers.

The extension method is rated low by most of the respondent (42.7%). The low assessment of this extension method indicates that the extension method used inpheromone socialization is still not satisfactory to farmers. This situation may be caused by the selection of methods by extension workers that are not in accordance with the material presented or it can be because farmers are less interested in the material, so that with any method, because they are not interested, the learning objectives do not achieve the expectation [10]. These results are in line with the results of Alim's research
[14] which stated that the use of extension methods must be carried out by applying methods that are adapted to physical environmental conditions, economic capabilities, and socio-cultural values.

Most of the respondent rate low (40%) for extension media. These results indicate that the selection of media in extension activities has not satisfied the farmers, they assume and hope that the media will make it easier for them to receive the material. The results of interviews with farmers indicate that the media used is relatively monotonous or less varied. Meanwhile, according to Daliani [15] the extension media can be adapted to the target audience to make it easier to accept innovation considering the different levels of ability and education. In line with Rahmawati et al. [16] Dissemination of information technology through communication media is a reciprocal and inseparable series in the effort to spread innovation.

4.2.4. Adoption performance

The results of the descriptive analysis of the adoption rate show that all adoptionindicators are considered low by most farmers, as detailed in Figure 5.

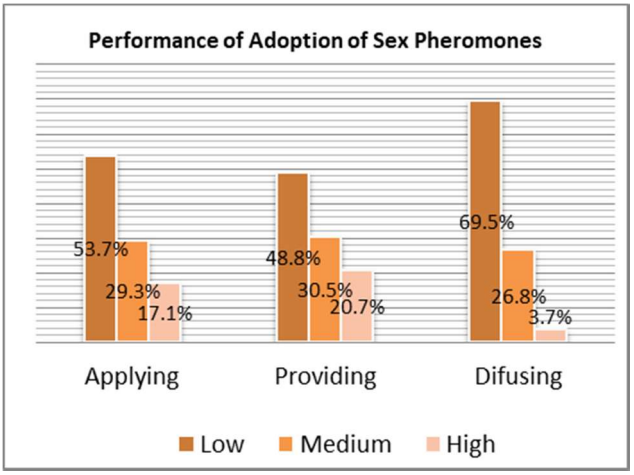


Figure 5. Performance of Adoption of Sex Pheromones

The level of pheromone adoption by farmers is generally in the low category. Based on in-depth discussions with respondent farmers, it was explained that pheromones are new things so they are still waiting and seeing the results of using pheromones. In other words, they are still hesitant to immediately use pheromones instead of the method they used before. The information obtained regarding pheromones as one of the controllersof Sweet potato weevil is not yet complete, so there is still a need for ways to further intensify the use of sex pheromones in controlling sweet potato weevil in Cilembu sweet potato. Farmers need time and process to adopt an innovation, they must see success story and convince themselves first [8]. The adoption process will go through stages before the community will accept it. At each stage of adoption there are personal and environmental factors that influence the adoption. [17]

Diffusion is the process of socializing an innovation through certain channels over time among members of a social system [8]. Diffusion occurs when the innovation provider is willing to spread the innovation produced, while the recipient is able and willing toaccept the innovation. Diffusion is a special type of communication concerned with the spread of messages that are perceived as new ideas. Diffusion has a special character because of the novelty of the idea in the message content. So some degree of uncertainty and perceived risk is involved in the diffusion process [8]. The results showed that the diffusion of sex pheromones is categorized as low by most of the respondent farmers (69.5%); this indicates that sex pheromones have not yet spread in the social system of farmers in Sumedang District, so intensive efforts are still neededto promote sex pheromones from farmers to other farmers. Information obtained from discussions with farmers, they are reluctant to ask about the success of other farmers who have successfully applied pheromone technology even though a pilot or demonstration of innovation has been carried out to make easy observation and prove directly.

4.3. Factors Affecting Adoption

The results of the regression analysis using the Ordinary Least Squares (OLS) estimation method give a Beast Linear Unbiased Estimator (BLUE) result when it meets the classical assumptions. The regression model chosen is the best regression model that has passed the stepwise method. The stepwise method is a method of selectingthe best regression model by selecting variables based on the largest partial correlation with variables that already exist in the model. The best regression model is a model that can best explain the behavior of the dependent variable by selecting the independent variables from the many independent variables of the data [18]. The results of multiple linear regression testing using the stepwise method are presented in Table 1.

Table 1. Results of analysis of the Best regression model with Stepwise variable method regarding adoption

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
R-square	0.555	-	-	-	-
(Constant)	0,571	0,333	-	1,718	0,090
Production unit	0,578	0,061	0,714	9,508	0,000
complexity	-0,218	0,088	-0,186	2,47	0,016

a. Predictors: (Constant), Production unit, complexity.

Based on the results of the regression analysis in Table 1, it is known that the factors that influence the adoption of pheromones (ά=0.05) are the production unit of the farmergroup function and the complexity of the innovation attribute. The production unit givesa coefficient of 0.578, and the complexity of innovation is -0.218. The constant obtained is 0.571 and the R-square is 0.555. From these results, the regression equation can be formulated:

$$Y = 0.555 + 0.578X_{1.3} + 0.218X_{2.3} + Ɛ$$

These results can be interpreted: (1) if the $X_{1.3}$ and $X_{2.3}$ factors are zero (0) then the adoption of pheromone innovation will be 0.555; (2) if $X_{2.3}$ is zero (0) then pheromone adoption will increase by 0.578 times, similarly, if $X_{1.3}$ is zero (0) then pheromone adoption will increase by -0.218 times. The results of this study found an R-squarevalue of 0.555, meaning that the group function factor as a unit of production and the observability of innovation contributed to the research results by 55.5 percent, while the other 44.5 percent came from other variables outside this study.

The results of this study prove that the production unit as a function of farmer groups and the observability of the process and results of pheromone innovation play a role in determining the adoption of sex pheromones for pest control of sweet potato weevil in Cilembu sweet potato plants. These results strengthen Rogers [8] that the characteristics inherent in innovation, which are better known as innovation attributes, are a prerequisite for acceptance or rejection of an innovation. Furthermore, it is stated that the increase in adoption rates will only be obtained if there is a willingness of early

adopters to diffuse innovations. This depends on the existence of a sense of responsibility and solidarity, willingness to share ideas and expertise, and unity of group members to achieve common goals, and willingness to accept innovations dependingon the belief of each individual regarding the benefits received if using the innovation forhimself and the group.

The coefficient value of the production unit ($X_{1.3}$) is 0.578 with a positive direction, meaning that the better the function of the production unit in the farmer group, the higher the adoption rate will be 0.578. Stimulants that can be given in strengthening the function of farmer groups as production units are carried out by making farmers awareof the existence of farmer groups. A farmer group is a business unit that can bedeveloped to achieve an economic scale of farming activities carried out by each member of the farmer group. Farming activities must be a business unit that can be developed to achieve economies of scale, both in terms of quantity, quality, and continuity [7]. Strengthening the function of the farmer group as a production unit cannotbe separated from the implementation of agricultural extension activities, this is in line with the opinion of Fatchiya and Siti [18], who stated that the application of innovation is closely related to the implementation of agricultural extension.

The value of the complexity coefficient ($X_{2.3}$) is -0.218 with a negative direction which means that the less complicated the pheromone technology, the easier it is to adopt the technology, this will increase adoption by 0.218. Complexity is the degree to which an innovation is considered difficult to understand and use [8]. Simplification of pheromones is necessary and must be done so that farmers are willing to adopt this technology. In addition, the improvement of information dissemination and the use of pheromone techniques is still being carried out, while the level of complexity does not become an inhibiting factor in the adoption of innovations. Research by Serow and Zorowski [19] showed that complexity is often found to be inversely related to the diffusion of innovation, while simplicity, or ease of use, makes for a wider and faster acceptance. The results of this study are also supported by research by Mardikanto [20] which stated that the speed of adoption is influenced by many factors, one of which isthe nature of the innovation itself, both inherent in the innovation and the extrinsicnature and environmental conditions.

4.4.Strategy of Increasing

Pheromone Adoption

From the results of descriptive and regression analysis it was found that the factors that influence the adoption of pheromones are the unit of production and the observability of the process and results of sex pheromone innovation, as the following model equation:

$$Y = 0.555 + 0.578X_{1.3} - 0.218X_{2.3} + \mathcal{E}$$

Based on the results of the study, the level of farmer adoption of the use of pheromone technology is still in the low category. Therefore, it is necessary to formulate a strategyto increase the adoption of pheromone technology. Determination of the strategy to increase the adoption of sex pheromone is based on a description of the level of adoption of pheromone technology and the factors that influence the adoption of pheromone technology.

From the descriptive results, it was found that the function of the group as a production unit is rated by farmers as low category and the results of the regression analysis also gave a significant influence on the adoption of pheromones. Moreover, the factor that gave a significant influence was the complexity attribute which according to the resultsof the descriptive analysis is rated moderate by most farmers.

Based on these results, increasing the adoption of sex pheromones by farmers in Cilembu sweet potato plantations in Sumedang District can be achieved by increasing the intensity of extension activities in farmer groups with materials based to the needs, especially the function of the group as a production unit. in addition, providing an understanding of the technical application, benefits of using pheromone, and the advantages or disadvantages of sex pheromones for pest control of Cilembu sweet potato plantations is also needed. Moreover, in extension activities, the availability of resources and local conditions in selecting and applying the extension methods and media to be used must be considered. The method that will be used is not only conventional methods such as face-to-face by providing printed media (folders, leaflets, posters, and brochures) but can be combined with modern digital media such as:YouTube, videos, Instagram, blogs, vlogs etc.

5. CONCLUSION

The results of the study found: (1) the level of adoption of sex pheromones for pest control of boleng in cilembu sweet potato plantations in Sumedang Regency is still relatively low so efforts are needed to increase the adoption of sex pheromones, this situation is due to: (a) the function of farmer groups as production units is consideredlow by most of the farmers (53.7%), while the function of the learning class and the vehicle for cooperation was rated as moderate; (b) sex pheromones are considered by farmers to have relatively high complexity so that they are not easy to apply and have low compatibility meaning that they are not in accordance with their habits, and (c) the methods used in extension are considered low, meaning they are not in line withfarmers' expectations; (2) the factors that influence the adoption of sex pheromones are the function of the farmer group as a production unit and the complexity of innovation,
(3) the strategy for increasing the adoption of pheromones is carried out by increasing the intensity of extension activities in farmer groups with materials according to the needs, especially the function of the group as a production unit, and provide an understanding of the technical application, benefits of use, and the advantages ordisadvantages of sex pheromones for pest control in Cilembu sweet potato plantations.

6. ACKNOWLEDGMENT

With the preparation of this article, all authors would like to express their gratitude to those who helped, especially the respondent farmers in the villages of Pamekaran, Pasirbiru, Rancakalong, Sukasirnarasa, and Nagarawangi for their willingness to become respondents in the study. Likewise, fellow extension workers, especially in UPTD Rancakalong, Sumedang District. We would also like to thank my colleagues, lecturers of the Sustainable Agricultural Extension Study Program, Department of Agriculture, Bogor Agricultural Development Polytechnic for their support and assistance. We also thank the Director of Bogor Agricultural Development Polytechnic for the opportunity and support.

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