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SISTEM PENDUKUNG KEPUTUSAN PENENTUAN PENYAKIT *BUSUK KUNCUP* PADA TANAMAN KELAPA SAWIT DENGAN METODE *TREND MOMENT* DI PT.PERKEBUNAN NUSANTARA III (PERSERO) KEBUN AEK NABARA UTARA

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Abstract

Oil palm planting has bright prospects due to the sufficient availability of various supporting factors, although there are also various challenges to the existence and sustainability of these natural resources. Oil palm (Elaeis Guineensis Jacq) is a plantation crop that is very tolerant of unfavorable environmental conditions. Bud rot (spear rot) is a disease that attacks the bud or shoot area of oil palm plants. You have to be wary of this disease because it attacks young plants so that the plant grows abnormally, is unable to form fruit, is stunted, and grows slowly. The most worrying thing is that the attack is at the growing point. If a hole is made in the stem, a foul-smelling yellow liquid will come out. The decision support system is a system device capable of solving problems efficiently and effectively, which aims to assist decision making in choosing various decision alternatives which are the result of processing information obtained using a decision making model. Using the Trend Moment method, the aim is to determine the criteria for determining bud rot disease in oil palm plants at PTPN III Aek Nabara Utara.

1. INTRODUCTION

Oil palm (Elaeis Guineensis Jacq) is a plantation crop that is very tolerant of unfavorable environmental conditions. However, to produce healthy growth and maturity and produce high production, a certain range of environmental conditions is needed to influence the successful development of oil palm plants [1]. Bud rot disease (spear rot) is a disease that attacks the bud or shoot area of oil palm plants. You have to be wary of this disease because it attacks young plants so that the plants grow abnormally, are unable to form fruit, are stunted, and grow slowly. Decision making is a process of choosing an action among several existing alternatives, so that the desired goal can be achieved [2]. Decision making problems can become complex because of the involvement of several objectives and criteria.[3]

Using the Trend Moment Method, it can be concluded that the Trend Moment Method is used to overcome the problem, namely forecasting the production of Mackerel Fish Crackers. By creating this system, it can make it easier for mackerel fish cracker managers to make production forecasting decisions, so that the mackerel fish cracker production process can be carried out effectively and more efficiently [4]. Zirang Utama Semarang's work was successfully applied to the system, so that the system can predict future sales from calculation results using past sales data [5]. Merdeka Adi Perkasa, concluded that the trend moment method obtained the highest MAPE results of 4.08% and the lowest 36.12%, while the simple moving average method obtained the highest MAPE results of 3.25% and the lowest 23.12% [6]. Other research was also carried out by Muhammad Priyono Tri s., M .Eng regarding the Decision Support System for Predicting Indonesian Workers Using the Trend Moment Method Approach in East Java, concluded that designing a decision support system program for predicting Indonesian workers using the trend moment method approach can help prospective Indonesian workers in determining the destination country [7]. The Trend Method at the Delima Jaya Store to Determine the Amount of Stock Needed, concluded that the trend moment method is to determine the smallest error rate compared to other methods [8].

Book sales use the trend moment method [9]. Other research was also conducted by Moyo Hadi Poernomo regarding the Synergism of the Trend Moment Method as a Decision Support Model in Visual Sales Forecasting Design, concluding that a Decision Support System using a sales forecasting projection method for an item, one of which is Trend Moment, can be a tool.), in making decisions a decision maker uses a computerized system [10].

2. RESEARCH METHOD

Method means the path followed to achieve the goal. In Arabic, the method is called thariqat; In the Big Indonesian Dictionary, method is: "an orderly and well-thought-out way to achieve a goal". In this way, it can be understood that method means a method that must be followed to present learning material in order to achieve teaching objectives.[11] A Decision Support System is a system intended to support managerial decision makers in semi-structured decision situations. Bud rot disease (spear rot) is a disease that attacks the bud or shoot area of oil palm plants. This disease starts from the shoots, if not controlled it can spread to other fronds nearby and can even cause death.

DFD is a system design tool that is oriented towards data flow with a decomposition concept that can be used to describe system analysis and design that is easily communicated by system professionals to users and programmers [12]. This ERD represents how entities are related to each other in the database. [13]. Context Diagram is a tool used in analyzing the system to be developed. The symbols used in the Context Diagram are almost the same as the symbols in the DFD, only the Context Diagram does not contain file symbols [14]. PHP is known as a scripting language, which is integrated with HTML tags, executed on the server, and used to create dynamic web pages such as Active Server Pages (ASP) or Java Server Pages (JSP). PHP is an Open Source software[15]. Uploading is the process of transferring data or files from a client computer to a web server [16]. Web browser to see the results of the script you wrote [17]. Cascading Style Sheet (CSS) is a rule for arranging several components in a web so that it will be more structured and uniform[18]. The CSS used in creating this website is to collaborate with HTML in order to produce an attractive website appearance [19].

Trend moment is a method that uses certain statistical and mathematical calculation methods to determine the function of a straight line, as a substitute for broken lines formed by historical company data.

Tabel 1. Estimated Bud Rot Disease

Moon	Time (X)	Number Of Bud Rot (Y)
October	0	40
November	1	40
Desember	2	38
January	3	38
February	4	36
March	5	34
April	6	35
May	7	35
Juny		
	∑x =28	∑y =256

$Y = a + bx$

Where:

Y: trend value

a: constant number

b: slope or coefficient of trend line

x: time index (x = 0,1,2,..n).

Meanwhile, to calculate the values of a and b

$\sum Y = n.a + b\sum X$

$\sum XY = a \sum X + b\sum X^2$

Where:

∑Y : Cumulative and historical amounts

n : Total data

∑X : Cumulative amount of time

∑XY: Sales data times time

To complete the calculation according to the formula above, you must find the X.Y value (time times the number of bud rot) which is presented in the following table

Tabel 2. Estimated Results

Time x Number Of Bud Rot	X^2
0	0
40	1
76	4
114	9
144	16
170	25
210	36
245	49
∑XY=999	$\sum X^2$=140

∑y = a.n+b∑x
256 = a.8+b.28
8a + 28b = 256…….(pers 1)
∑xy = a. ∑x + b. ∑x2
999 = a . 28 + b . 140
28.a + 140b = 999…….(pers 2)
After equation 1 and equation 2 are obtained, the next step is to eliminate equations 1 and 2 with the following results
8a + 28b = 256…..(1) x7
28a + 140b = 999…..(2) x2
56a + 196b = 1792
56a + 280b = 1998
-84b = -206
b = -206
-84
b = 2,45
and 8a + 28b = 256
8a + 28 (2,45) = 256
8a + 68,6 = 256
8a = 256 – 68,6
8a = 187,4
a = 187,4
8
= 23,42
Results :
y = a + b . x
y = 23,42 + (2,45 . 8)
y = 23,42 + 19,6
y = 43,02

3. RESULT AND DISCUSSION

After discussing several program design displays in the previous chapter, there are several input and output displays that the author will display according to the design that the author has designed
Login Display Below
The author will display an interface for the main page of the expert system application when it is run

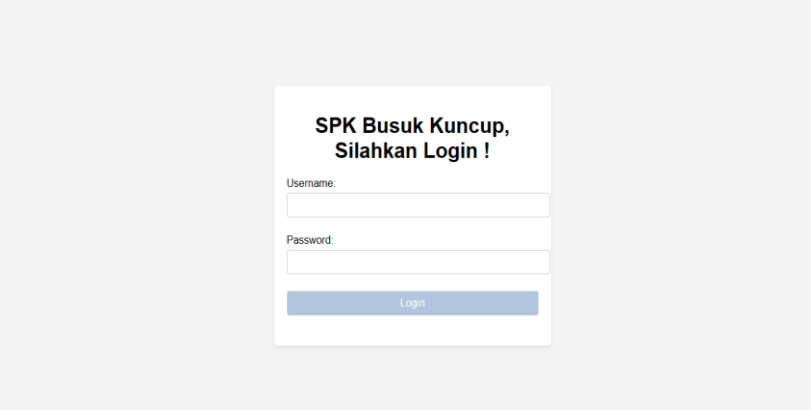

Figure 1. Login Display

In this display, the user can carry out the first process, namely logging into the system by entering the username and password. If the username and password are not in sync or incorrect, the user cannot enter the main menu.

Home View

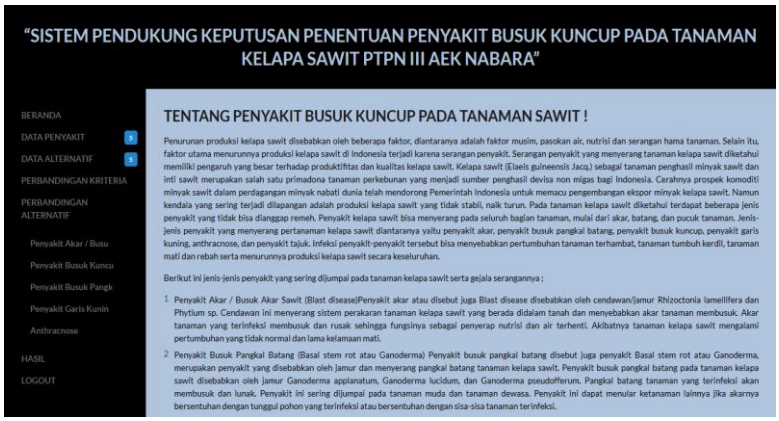

Figure 2. Home View

Home View, users can find out what bud rot disease is in oil palm plants. Apart from that, in the home menu the user can operate several other menus such as the disease data menu, alternative data menu, criteria comparison menu, alternative comparison menu, results menu, and logout menu.

Disease Data Display Figure

Figure 3. Disease Data Display

Disease Data Display, disease data or criteria data is displayed. Users can choose which disease to operate on, because the author discusses bud rot disease, users can choose data on that disease

Alternative Data Display

Figure 4. Alternative Data Display

Alternative Display, the user can view and operate the Alternative Data menu in the form of a menu of categories or levels of oil palm plant bud rot disease. Users can classify the disease based on data on whether it is included in the very mild menu, not severe menu, neutral menu, severe menu, and very severe menu.

Alternative Comparison Display

Figure 5. Alternative Comparison Display

Alternative Comparison Display, in this menu the user only needs to make a comparison in the form of disease group level data with comparison values. Users must fill in this menu to get the results.

Criteria Comparison Display

Figure 6. Criteria Comparison Display

Criteria Comparison Display, different from alternative comparisons where this comparison contains criteria with value comparisons. Users only need to select the type of bud rot disease criteria because this discussion concerns bud rot disease in oil palm plants.

Result Report Display

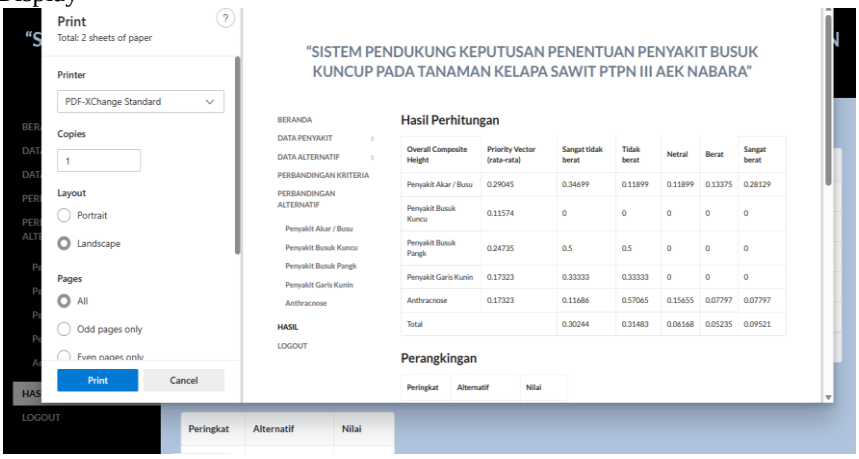

Figure 7. Result Report Display

Result Report Display After the user has filled in all the menu stages, the results will appear automatically as in figure 4.7 Result Report Display.

4. CONCLUSION

In discussing the conclusions, here are several conclusions that the author will explain based on the preparation of this thesis, namely: The design results can be carried out well according to needs. In designing an expert system, the diagnostic results presented are flexible and responsive. In storing and processing data the author uses the advantages of the PHP and SQL programming languages, the entire results of which are stored in a database (MySQL).

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