

# Design of the expert system to analyze disease in Plant Teak using Forward Chaining

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## ABSTRACT

Teak is one kind of plant that is already widely known and developed by the wider community in the form of plantations and community forests. This is because until now Teak wood is a commodity of luxury, high quality, the price is expensive, and high economic value. Expert systems are a part of the method sciences artificial intelligence to make an application program disease diagnosis teak computerized seek to replace and mimic the reasoning process of an expert or experts in solving the problem specification that can be said to be a duplicate from an expert because science knowledge is stored inside a database Expert System for the diagnosis of disease teak using forward chaining method aims to explore the characteristics shown in the form of questions in order to diagnose the disease teak with web-based software. Device keel expert system can recognize the disease after consulting identity by answering some of the questions presented by the application of expert systems and can infer some kind of disease in plants teak. Data disease known customize rules (rules) are made to match the characteristics of teak disease and provide treatment solutions.

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## I. Introduction

Teak is a commodity of wood luxury, high quality, the price is expensive, and high economic value. Teak wood can be used as a base for housing construction, bridge construction, plywood, chassis frames, doors, windows, carving crafts of high artistic value also for furniture. In Indonesia, Teak is one plant that is able to contribute to the supply of wood raw material [1]. Excess Teak lies not only in the quality of wood which was very nice and very high economic value but also because of the properties of the silvicultural generally been mastered [2]. Teak wood is durable and strong. However, there are problems that hamper the process of the teak cultivation. There are various

problems that arise in the process of cultivating teak, for example, the process of obtaining seeds of superior quality, the wrong way of planting, breeding, and the most common is the problem of pests and diseases [3]. Pest and disease problems are very disturbing pstemuctivity of teak farmers , because it can lead to decreased quality of pstemuction even the worst can lead to crop failure [4]. Consultation to someone who has expertise in certain subject in solving a problem is the right choice in order to get answers, advice, solutions, best decision or conclusion [5]. Answer an expert on a consultancy course very trustworthy or accountable and can affect the quality and the quality of the result of a problem, this is because an expert is always dominated to the

plane he learned based on science and experience [6]. In this case the role of an expert is very reliable for determine the type of pests and diseases and give examples of countermeasures in order to get the best solution [7]. Similarly, if found any kind of pests and new diseases in plants, then an expert should do some research in order to obtain the particulars of pests or diseases new and as soon as possible socialization to farmers or farmer groups about the types of pests and diseases of new and how to handle [8]. However, there are constraints facing farmers plant teak. One is, the limitations to consult to an expert [9]. What if want to ask an expert about what caused crop failures and others, and the additional costs to be incurred when you want to consult with the experts [10]. This research explains how the methodology used to solve research problems [11]. The purpose of this study was to analyze the disease in teak plants so that it can find a solution for the problematic of teak because not all mobile workers know about pest control [12].

## II. Methods

Research conducted at the place of teak plantations in Pasaman, where the plantations are privately owned teak plantations and also many teak plants are attacked by pests and diseases [13]. Research data collection techniques using direct analysis techniques in the field and accompanied by expert interviews method / field workers on the issues of disease and pest what and how the situation encountered in the field [14]. Information displayed on the system includes data diseases / pests that have identified the symptoms and solutions. In this menu the user can analyze the plant in question [15]. Having followed all the processes that are expected by the system will display the information of users, types of diseases / pests that attack, and solutions to overcome the disease / pest on plants teak [16].

## III. Result

The characteristics of the disease that can be identified on a teak plantation consists of three aspects, namely [17] :

1. Physical Symptoms
2. Time Attack
3. Age Plants Attacked

Thus, it can be determined the characteristics of the table or tables identifying disease symptoms of the disease that is seen as in the following table [18]:

Table I Data Pest / Disease and Characteristics

No	types of pests	Physical symptoms	time Attack	Age Plants Attacked
1	Teak caterpillar pests	Perforated leaf	Nov-jan	Mature teak
2	Uretpests	Damaged roots and plants wilt	February-april	Seed field
3	Red mite pests / akarina	Pale yellow leaves	June-august	Seedling
4	White Mite pests / lice wax	Curly leaf shoots	Any time	Mature teak
5	White fliesPests	Wilted leaves and Perforated stem	Any time	Seedling
6	Wilt disease	Wilted leaves and sandbar	August-february	Seedling
7	Termites Pests	Perforated stem	Any time	Mature teak
8	Shaky-shaky	There is liang auger in stem	March april	Mature teak
9	Borer shoot pest	Nursery shoots wither	Any time	Seed field
10	White Mite pests	Leaf curl	February to september	Mature teak
11	White butterflyPests / diver	Fall	February to september	Mature teak
12	Powder wet beetle pest	Skin stem become dark chocolate	Any time	Mature teak
13	Bacterial wilt disease	Wilted leaves, scrolling and dries	Any time	Seed field / Mature teak
14	Inger-inger	Swelling in stem	Any time	Mature teak

As for the solution or way of controlling diseases / pests that attack plants teak above are:

Table II

No	Code	Identification
1	C01	Theplant's age that attacked is mature teak
2	C02	Theplant's age that attacked is Seed Field
3	C03	Theplant's age that attacked is Seed
4	C04	Perforated leaf
5	C05	Damaged roots
6	C06	plants wilt
7	C07	Pale Yellow Leaves
8	C08	Curly leaf shoots
9	C09	Withered leaves
10	C10	Perforated stem
11	C11	Sandbar leaves
12	C12	There is liang auger in stem
13	C13	Nursery shoots wither
14	C14	leaf curl
15	C15	Fall
16	C16	Skin stem become dark chocolate
17	C17	Scrolling leaves
18	C18	Withered leaves and Dries
19	C19	There is Swelling in stem
20	C20	Occurred Between the November-January
21	C21	Occurred Between the February - April
22	C22	Occurred Between the June - August
23	C23	Occurred Between the August - February
24	C24	Occurs Between the March-April
25	C25	Occurred Between the February - September

As in this case, there are 27 rules needed to find a conclusion to be made through the questions that correspond with the identification data. From the identification data that has been obtained as shown in Table 6 above, the question can be classified by age identification variable plants are attacked first. Because the plants age data are common traits, which is where one of the plants age certainly is True that later will facilitate reasoning to determine identification which subsequently came to the conclusion sought. If the system already knows the age of teak plants are attacked, it will continue with questions about physical symptoms and the time of the attack. The rules are reflected in the hierarchy of the following Rules :

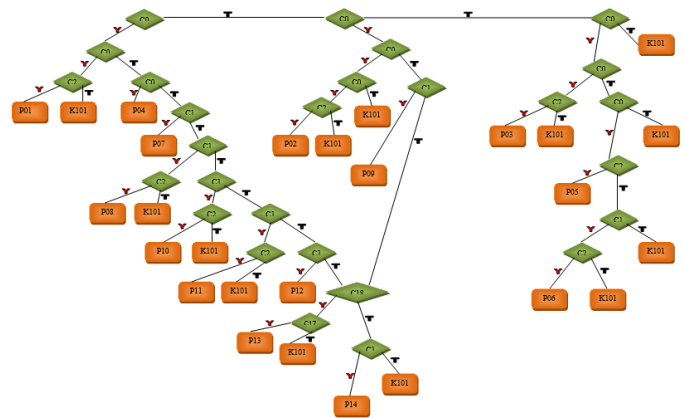


Table III Table Description

Structure	Explanation
C01	Theplant's age that attacked is mature teak
C02	Theplant's age that attacked is Seed Field
C03	Theplant's age that attacked is Seed
C04	Perforated leaf
C05	Damaged roots
C06	plants wilt
C07	Pale Yellow Leaves
C08	Curly leaf shoots
C09	Withered leaves
C10	Perforated stem
C11	Sandbar leaves
C12	There is liang auger in stem
C13	Nursery shoots wither
C14	leaf curl
C15	Fall
C16	Skin stem become dark chocolate
C17	Scrolling leaves
C18	Withered leaves and Dries
C19	There is Swelling in stem
C20	Occurred Between the November-January
C21	Occurred Between the February - April
C22	Occurred Between the June - August
C23	Occurred Between the August - February
C24	Occurs Between the March-April
C25	Occurred Between the February - September
C26	Occurred Between the February - September
C27	perforated stem
P01	Teak caterpillar pests
P02	Uretpests
P03	Red mite pests / akarina
P04	White Mite pests / lice wax
P05	White fliesPests

Improvement of infant neonate infarction condition if lag time between attack and handling still less than three hours and immediately opening the blockage, then can still be expected optimal recovery in patient. In addition to this, efforts to reduce risk factors for the occurrence of infarct among other things, by maintaining the stability of blood pressure, maintaining the balance of weight badaa, as well as the stability of blood sugar and cholesterol levels by improving diet and not smoking.

#### IV. Conclusion

Based on the design that has been created, it can be concluded that : it is necessary to create an application program that can be used to detect disease in plant teak. From the application program that created later are able to provide solutions to overcome problems or diseases that attack plants teak. To get a more varied this research may be further developed by researching new diseases that arise with the characteristics or symptoms that mark the disease. It is very important to investigate new symptoms that arise in disease of teak plant that already exists. Several types of pests may become resistant to a particular pesticide, therefore needs to be done towards innovation and new solutions to pest arising. Necessary new innovations for the pest handling so that more effective.

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