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RESEARCH ARTICLE

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Local Wisdom of Pest Attack Control in Residential Areas (Study Case: Gunung Meja Nature Park, West Papua, Indonesia)

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ABSTRACT

Healthy plants can be seen from good morphology and are not even attacked by pests. Local community knowledge of seeing symptoms and signs of plant stature will be very helpful, especially in dealing with problems related to plant growth. This study aims to determine the form of local wisdom in dealing with plant pests in residential areas around the Gunung Meja Nature Park. The method used is observation and interviews related to the identification of forms of attack, the level of pest attack on plants, and their handling by the community. The research object is focused on multipurpose tree species that produce wood and non-timber trees such as fruits that have high economic value. The results showed that the number of plant species in Anggori was 137 plants with a diversity index (H) of 2.956 which was included in the medium category. Plants in Anggori also suffered damage caused by pests with an attack frequency (FS) of 50% and attack intensity (IS) on plants of 21%. Pest control has been carried out by the community traditionally, such as 12% pruning, 8% logging, 20% fumigation, 8% stove ash and 16% soap to eradicate pest attacks.

Introduction

Plants are one of the living things found in nature. Plants have leaves, stems, and roots so they can produce their own food through the process of photosynthesis. Plants can also convert carbon dioxide (CO_2) produced by humans and animals into oxygen (O_2). Plants can also be used as a source of food, medicine, fresh air, and beautify the yard. A yard is land around the house with private ownership status and has clear boundaries in the form of walls, iron fences, fences made of plants, or depending on customs, habits, socio-cultural community, economic status, location of the yard, and so on [1]. The yard has a complex structure, as well as a green open space (GOS) that resembles a miniature tropical forest. Yards can be used to grow productive plants such as ornamental plants, fruits, vegetables, spices, and medicines.

A plant is said to be healthy if the plant has good growth and does not experience health deviations in all or part of the plant's organs which can cause harm to the plant [2]. One of the causes of damage to plants is the appearance of insects. Insects or pests are plant destroyers in the roots, stems, leaves, or other plant parts so that plants cannot grow properly or die. The level of damage caused by pests varies quite a bit depending on the type of species and abiotic factors [3]. Identification of pest and disease attacks is basically the start of knowing a plant needs special care or attention to improve the plant itself [4]. The purpose of this research is to find out the diversity of plant species and methods of pest control that exist in the Anggori residential area of Gunung Meja Nature Park.

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Material and Methods

Study Area

This research was conducted from April to May 2022. The method used was the observation method of the level of pest attacks on plants, and then the data was validated through interviews with housing owners. Data collection was carried out in Anggori (Figure 1), which is a residential area in the Gunung Meja Natural Tourism Park, in Manokwari Regency, West Papua Province. Anggori is an area where people still plant or farm in their yards with various types of plants. Administratively, Anggori is located in the Amban sub-district which is in the West Manokwari District, Manokwari Regency, West Papua Province.

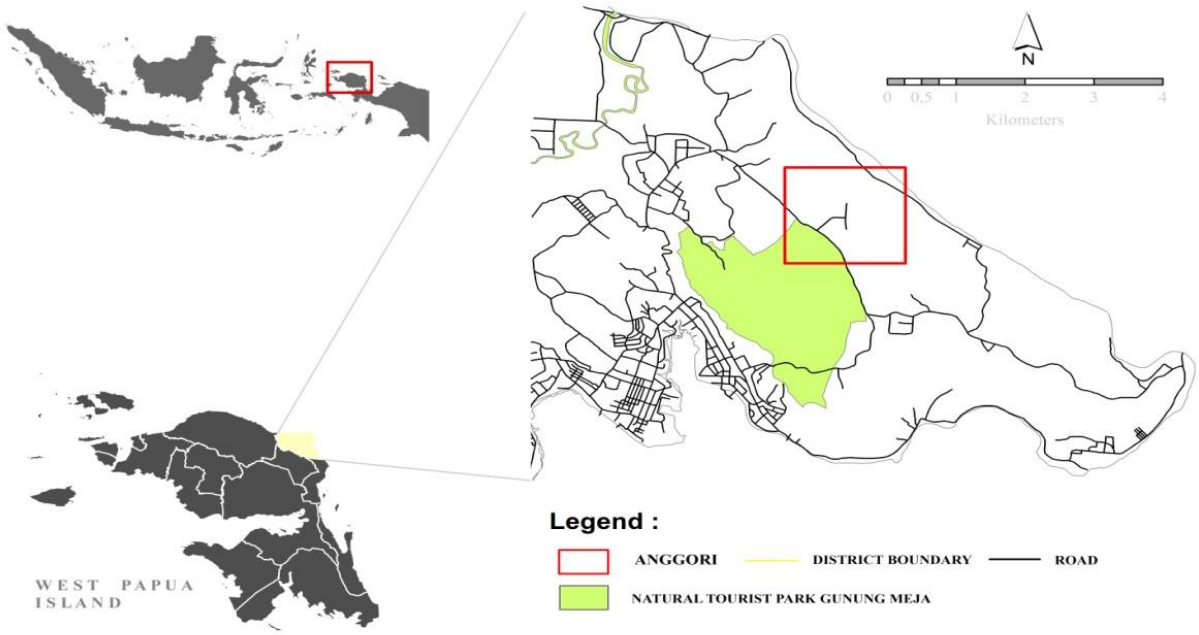


Figure 1. Map of research locations.

Data Collection

Damage to plants was observed at the tree level, namely on Multi-Purpose Tree Species (MPTS) species that generate high-value non-timber products like fruits in addition to wood. Based on the type of damage caused by pests or destructive insects, crop damage is evaluated using criteria or categories of plant assessment. Visual inspection of the plants in the Anggori residential area of the Gunung Meja Natural Tourism Park was done to obtain field data on any flaws or damage brought on by pest infestations (Figure 2).

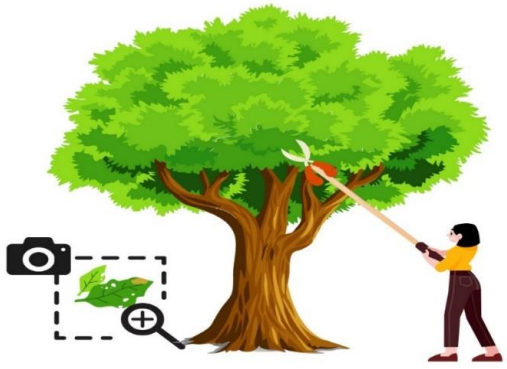


Figure 2. Retrieval of plant damage data.

The distinct harm from each damage caused by insects on the plants in the Anggori residential area of the Gunung Meja Natural Tourism Park will be evaluated. Different kinds of damage point to several bug species attacking garden crops. For instance, the appearance of windows and grooves on plant leaves as a result of insect pest damage, the development of protrusions or galls on the leaf surface, or leaf curling as a result of insect pest damage. A photo of each sort of pest damage to the plants that is present is then taken. The image is then utilized as a guide and a general indicator for each tree species afflicted by pests, as well as a picture of gathering plant damage.

Based on the sort of damage produced by destructive insect assaults, plant damage in the Anggori residential area of Gunung Meja Nature Park is evaluated using criteria or plant evaluation categories. Triwibowo et al. made modest changes to the symptoms of attack, for the criteria for pest attack on each plant [5]. The results of observing the level of damage will be examined and then rated using these criteria (Table 1).

Table 1. Yard pest attack value (score) calculation.

Criteria	Attack symptoms	Score
Healthy	There is no attack on the leaves of garden plants or good growth, green leaves, healthy and fresh.	0
Light attack	There are a few parts of the leaves of garden plants that are hollow, rolled, folded.	1
Moderately Affected	The perforated parts of the leaves of yard plants curl and fold up to the top of the plant, causing the leaves to turn yellow.	2
Heavy attack	The leaves of yard plants were severely damaged, of which half of the plants fell off or were bare and no more leaves.	3
Dead	All the leaves of the yard plants fall or there are no signs of life.	4

Data Analysis

Diversity of Plant Types

Species diversity index in a plant community is used to determine the diversity of plant species in the Anggori residential area of Gunung Meja Nature Park, the species diversity index (H) is calculated using the Shannon Wiener diversity index [6] in equation 1.

$$H = -\sum \left(\frac{ni}{N}\right) \log \left(\frac{ni}{N}\right) \quad (1)$$

Information:

H : Diversity index (Shannon Wiener index).

Ni : The number of individuals of each type.

N : The total number of individuals of all species.

Shannon Wiener's value for the species diversity index (H) is shown in Table 2 as follows:

Table 2. Criteria for Species Diversity (H) Shannon Wiener.

H > 3	:	Species diversity is abundant or high
1 ≤ H ≤ 3	:	Moderate species diversity
H < 1	:	Little or low species diversity

Source: [7]

Attack Frequency

Using the formula provided by Triwibowo et al., attack frequency (F) is computed by dividing the number of trees attacked by pests by the total number of trees observed [5]. It is then expressed in percent (%) in equation 2. While the assessment of the percentage (%) level of attack frequency (FS) of pests on plants in Anggori can be seen in Table 3.

$$FS = \frac{X}{Y} x\ 100\% \quad (2)$$

Information:

FS: Attack frequency, X: Number of trees affected, Y: The number of trees observed.

Table 3. Plant conditions due to pest attack.

Attack frequency (%)	Attack rate
0–1	Normal
1–25	Light
25–50	Currently
50–75	Heavy

Source: [8]

Attack Intensity

Intensity of attack (IS) of pests is calculated using the formula according to Triwibowo et al. as expressed in Equation 3. To describe the condition of the plant as a whole due to pest attacks, it can be determined based on the criteria according to Triwibowo et al. made slight changes to the intensity and conditions of the plants presented in Table 4 [5].

$$IS = \frac{X_1 Y_1 + X_2 Y_2 + X_3 Y_3 + X_4 Y_4}{XY} \times 100\ \% \quad (3)$$

Information:

IS : Attack Intensity

X : The number of trees observed

Y : Number of score criteria (4)

X1 : Number of trees lightly affected (Score 1)

X2 : Moderately affected number of trees (Score 2)

X3 : Number of trees heavily affected (Score 3)

X4 : Number of dead trees (Score 4)

Y1 : Score 1 with mildly attacked criteria

Y2 : Score 2 with moderate attack criteria

Y3 : Score 3 with criteria of severe attack

Y4 : Score 4 with the criteria of death or no signs of life

Table 4. Plant conditions due to pest attack.

Attack intensity (%)	Plant conditions
0 – 1	Normal
>1 – 25	*Rusak Ringan* (RR)
>25 – 50	*Rusak Sedang* (RS)
>50 – 75	*Rusak Berat* (RB)
>75 – 100	*Mati*

Results and Discussion

Composition of Plant Types and Families in Anggori

The area around the house known as the yard is suitable for growing ornamental plants, edible fruits and vegetables, herbs, spices, and medicinal plants. According to the findings of a study done in Anggori, the residential area of Gunung Meja Natural Tourism Park, 137 plant species were identified as belonging to different vegetation types. Figure 3 depicts the number of species in a visual manner.

The most dominant number of species based on vegetation level is *Mangifera odorata*, with a total of 23 species, and the second dominant species is *Lansium domesticum*, with a total of 12 species. This is in line with [9–11]in his research said that the dominant species is the type that can control the place where it grows and can also develop itself according to the overall environmental conditions or mostly feels at the highest level of all the types that exist in a vegetation community. The lowest number was *Aquilaria sp* 1 species, *Averrhoa* carambola 1 species, *Citrus hystrix* 1 species, *Durio sp* 1 species, *Flacourtia* inermis 1 species, *Gmelina* arborea 1 species, *Moringa oleifera* 1 species, *Sesbania grandiflora* 1 species, and *Tectona*

grandis 1 species. This is in line with Siburian et al. in his research said that a community that is said to be low is a community composed of species that have low or little dominance [12].

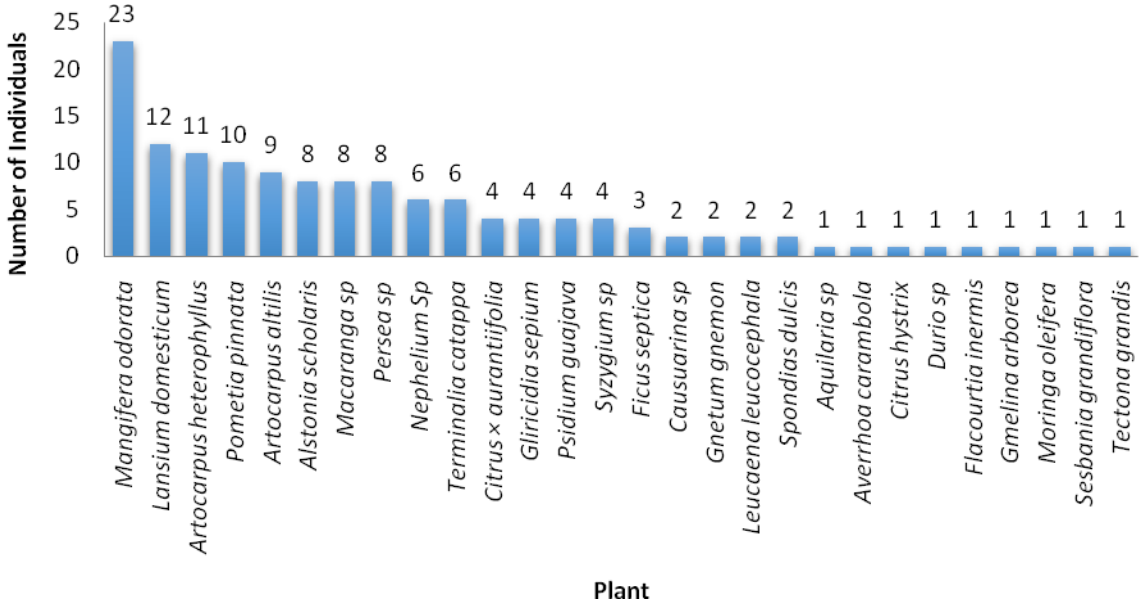


Figure 3. Graph of number of species based on vegetation level.

The most dominant number of families is the Anacardiaceae family with a total of 25 individual. Two of the most common species are found in Anggori, namely *Mangifera odorata* and *Spondias dulcis*, the least number of families are Malvaceae, Salicaceae, Thymelaeaceae, Moringaceae, Oxalidaceae, and Rutaceae with a total 1 individual, more clearly the data on the number of families in Anggori can be seen in Figure 4.

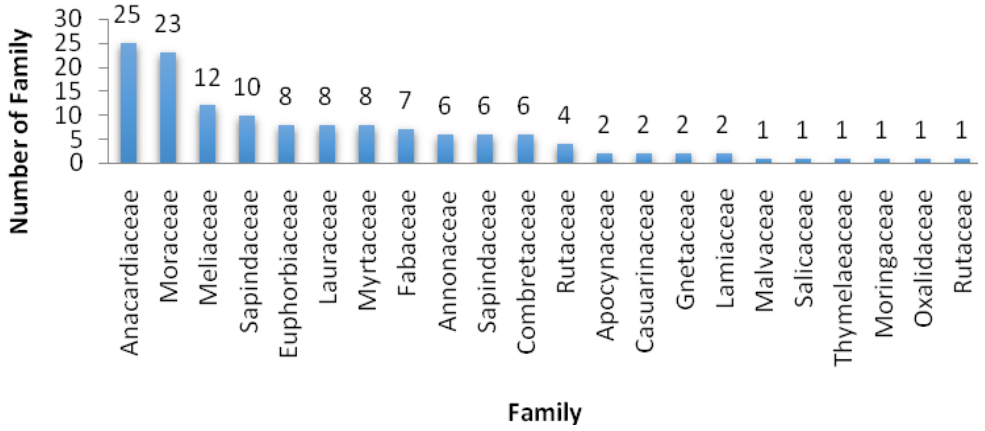


Figure 4. Graph of number of families based on vegetation level.

Diversity of Plant Types

The Shannon Wiener (H) diversity index is a diversity index that can describe vegetation diversity which is very useful for comparing one plant community with another plant community. Based on the results obtained on the diversity index calculated using the Shannon Wiener (H) index, the diversity in Anggori is 2.956 which is in criterion 1≤H≤3, which means that the species diversity index in Anggori is included in the medium category, the results of the analysis of the data obtained This is in accordance with the criteria for the Shannon Wiener species diversity index in [6] which stated that H values >3 indicated that species diversity was abundant or high, values 1≤H≤ 3 indicated that species diversity was moderate and H values <1 indicated that diversity was little or low.

The Shannon Wiener index value in Anggori has a moderate value because the number of species found is only about 29 species with a total number of individuals of 137 individuals; this is not proportional to the number of individuals of each species; each number of individuals in Anggori has a different number. This is in line with research conducted by Siburian et al. who said the value of the Shannon Wiener index depends on the number of individuals in a plant species, if a plant has a high number of individuals with a total of all individuals proportional to the number of individuals of each species, then the diversity value will be high [12].

Plant Damage

Based on the results of direct observations in Anggori, the residential area of Gunung Meja Natural Tourism Park, it was found that there was damage caused by pest attacks, which resulted in damage to the leaves of the plants becoming perforated and some were also damaged, even leaving only the leaf bones of the plants.

Damage Due to Movement or Grooves Forming Like a Window

The leaves of the *kedondong* plant in Anggori found damage caused by black leaf caterpillars, as a result the leaves of the *kedondong* plant will turn brown transparent or look like creaking or grooves that form like windows on the surface of the leaves, pictures of leaf damage can be seen in Figure 5a. Leaf caterpillars that attack *kedondong* plants live in clusters to attack *kedondong* plants. The characteristics of the leaf caterpillar found on the *kedondong* plant are: it has a black head, the body of this caterpillar is also black, it has 6 legs which are located 3 on the left and 3 on the right, on the back of the caterpillar's body there are protrusions that looks out, a picture of a caterpillar on a *kedondong* can be seen in Figure 5b.

Figure 5. (a) Damage to leaves due to grinding to form windows, (b) Images of black leaf caterpillars, and (c) Damage to plant leaves that have been eaten.

Not only does it make the plant leaves turn brown transparent, other visible damage is that part of the leaf or the tip of the branch from the young leaves has been eaten by the caterpillars, a picture of the damage can be seen in Figure 5c. Caterpillar insects on *kedondong* plants leave only the large central leaf bones. This is in line with research conducted by Nair et al. in their research on identifying the morphology of insects as potential pests and the level of damage to red meranti seedlings, saying that caterpillars that attack red meranti plants in groups can cause the affected plants to become bare and only remaining Bone leaves [13].

Damage to the Leaf Edges

Damage to the edges of the leaves occurs in water apple plants, the damage is caused by locust attacks that are eating plant leaves. Visible damage to the leaves of the water apple plant found parts of the leaves that were not completely eaten by the locusts. Pictures of water apple leaf damage can be seen in Figure 6a. The wood locust has a characteristic dark brown color, but when it is still a nymph (young grasshopper) the grasshopper will be green and then will change color to brown when the grasshopper is an adult. This is in line with research conducted by Shabrina et al. regarding the identification of plant health, said grasshopper nymphs or young grasshoppers were green while adult grasshoppers were brown [14].

According to Haerumi et al. grasshoppers have the following characteristics: grasshoppers have a head (head) on the head of grasshoppers have 2 compound eyes, and 2 short black antennae, thorax (chest) and abdomen (stomach), grasshoppers have body length 2.8 cm, grasshoppers have 3 pairs of pairs of legs where the front legs are short which are used for walking while the hind legs are long and large which are

useful for jumping far and high [15]. In addition, grasshoppers also have wings in the form of parchment, and the rear wing protectors are called tegmina. The shape of the hind wings is rounded and has a wing frame and is brown in color [16].

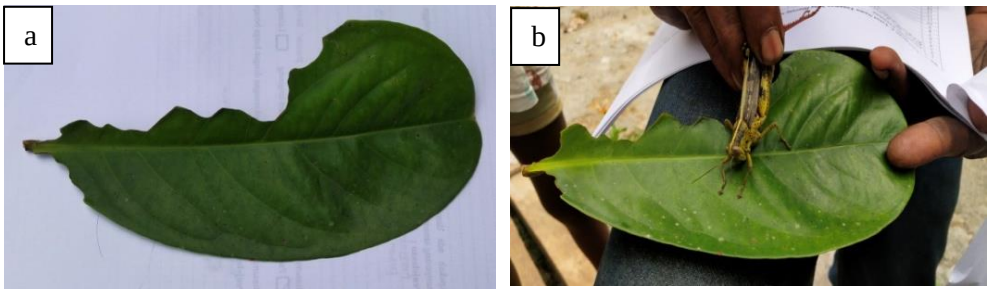
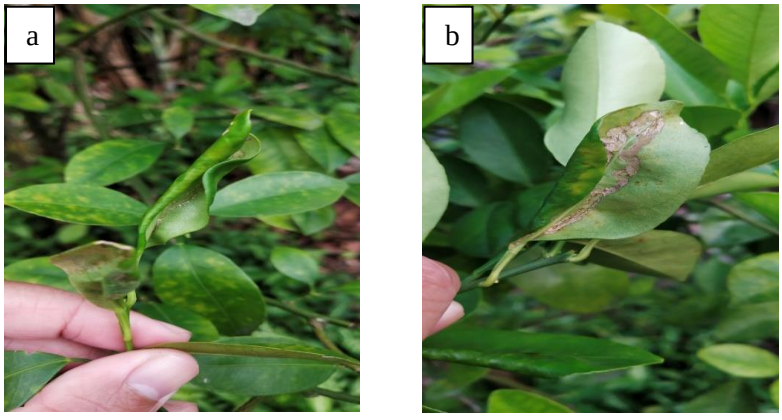


Figure 6. (a) Leaf margin damage on water apple plants, and (b) Grasshopper insects.

Wood locusts are insects that are included in plant eating insects or commonly called herbivores. When conducting research in the field, it was found that grasshoppers were eating or chewing the leaves of the water apple plant, and as a result of these bites there were bite marks on the edges of the plant leaves so that they could reduce the area of the leaves. An image of the grasshopper insect can be seen in Figure 6b. Grasshoppers have chewing mouthparts, so that grasshoppers will eat leaves not only in one part, but grasshoppers will move from one leaf to another in search of a good part of the leaf to eat [17]. This is in line with research conducted by Azwin et al. in his research said that locusts only eat part of the plant leaves and leave bite marks on the leaves which then cause the plant leaves to wither [18].

Damaged Plant Leaves with Rolling Symptoms

The leaves of citrus plants were found to have damage caused by pest attacks. Visible damage to the lime leaves was found to have rolled leaves and there were traces of caterpillars crawling inside the leaves, a picture of the rolling of the leaves of the citrus plant can be seen in Figure 7a. Leaf caterpillars will roll the leaves by connecting the two edges of the leaves so that the leaves will roll like a cone. This is in line with research according to Liunima in his research on an inventory of insect pests on citrus plants, saying that the orange peliang caterpillar is an insect that attacks many young leaves of citrus plants, the affected leaves will appear wrinkled, the edges of the leaves are rolled, curly and visible marks. grooves or grooves on the surface of the leaf [19]. Movements or grooves are a characteristic symptom that looks like lines or grooves that meander according to the places traversed when the peliang orange caterpillar eats, pictures of the cranes or grooves can be seen in Figure 7b.



(a) (b)

Figure 7. (a) Rolling of citrus plant leaves, and (b) movement or grooves of insects attacking the leaves.

Damage to Plant Leaves with the Appearance of Galls

Mango plant leaves were found to have damage caused by pests, visible damage on mango leaves found galls on the upper leaf surface of the plant. Galls is a state of abnormal plant parts such as leaves, stems, fruits or roots which are formed as a result of the plant's response to attack by organisms such as fungi,

bacteria, viruses or insects [20]. Symptoms of a mango plant that is attacked by gall are found in black nodules on the surface of young leaves or mango leaves which are at the top. The effects of galls on the surface of the leaves can disrupt the process of photosynthesis so that the leaves of the mango plant become stunted and their growth is not optimal. A picture of damage to mango leaves can be seen in Figure 8.

Figure 8. Damage to mango plant leaves with the appearance of black galls on the upper leaf surface.

The puru that is on the surface of the leaf starts from the initial white phase then changes color to blackish red. According to Chendvenkar the mango fly (*Procontarinia matteiana*) is a pest that attacks the leaves and fruit of the mango plant, the mango fly will lay eggs on the surface of young manganese leaves, the contents of the galls that are on the surface of the mango leaves are larvae or maggots that come from fly *Procontarinia matteiana* if the puru is cut in the middle you will see white larvae [21].

Plant Damage with Holes Leaf Symptoms

Plant damage also occurs in the leaves of the ketapang plant. Figure 9a shows that there are holes in the leaves. The holes in the leaves of the ketapang plant are found in various sizes; some are small, and some are rather large, but this can result in reduced photosynthetic results. what happens in the leaves. This is in line with research conducted by Putri et al. said that the most dominant damage was perforated leaves in 348 cases, meaning that more than 50% of plants experienced perforated leaf damage, which means that plant leaves lose parts of the leaves physically and this can reduce the results of photosynthesis that occurs in plants [22].

(a) (b) (c)

Figure 9. (a) Damage to Ketapang Plant Leaves, (b) Breadfruit, and (c) Rambutan with the appearance of holes on the leaves.

Damage to the leaves also occurs in breadfruit plants with visible holes on the surface of the leaves, apart from experiencing perforated leaves, breadfruit leaves are also damaged by changing the color of the leaves from green to brown around the hole area in the leaves due to the absence of chlorophyll in the breadfruit plant leaves, damage to the plant leaves Breadfruit can be seen in Figure 9b. This is in line with

research conducted by Prasetyo et al. in his research said that there were 177 perforated leaves on red Meranti plants, most of which were attacked by insects, this would cause the leaves to wither and turn brown in color due to the absence of chlorophyll in the leaves [23]. While the damage to the rambutan plant can be seen by the presence of holes on the surface of the leaves, the holes on the leaves of the rambutan plant are smaller than the holes on the ketapang and breadfruit plants. Damage to the leaves of the rambutan plant Figure 9c.

Plant Damage Assessment

Assessment of crop damage due to pest attacks is carried out in order to determine the intensity of attack (IS) of pests on plants. Damage to plants is grouped based on Yard Pest Attack Value (Score) Calculation in Table 1 where the grouping of these criteria includes the criteria for healthy, lightly attacked, moderately attacked, heavily attacked, and dead. From the results of the data obtained in Anggori, the residential area of the Gunung Meja Natural Tourism Park, 68 plants were attacked by insects, of which 23 were lightly affected, 40 were moderately affected, 5 were severely affected, as can be seen in Table 5.

Table 5. Classification of yard plant damage in Anggori.

No	Plant state	Amount
1	Light attack	23
2	Moderately affected	40
3	Heavy attack	5
4	Healthy	69
5	Dead	0
Total		137

Attack Frequency (FS)

Observations made in the Anggori residential area of Gunung Meja Natural Tourism Park found that the number of plants observed was 137 plants of the number of plants observed there were 68 plants that were attacked by pests. From the results of the calculation above, it is known that the frequency of pest attacks is 50%, which means that the condition of the plants in Anggori is indicated by pests and is categorized into the moderate category, and 50% are plants that are categorized as healthy. This is in line with research conducted by Koteng et al. in his research on the identification of insect pests, said that from the observed 2,880 seedlings, there were 980 *Trembesi* plant seeds that were attacked by pests ranging from 29.16 to 38.88% in the moderately damaged category [24]. And the same research was also conducted by Riona et al. in his research on the percentage of plants attacked by mahogany seedlings in the permanent nursery of BPDASHL Kapuas Pontianak which was 27% and was included in the moderate category [25]. This was because the climatic conditions at the time of observation were the rainy season.

Attack Intensity (IS)

Pest attacks on plants in Anggori observed in this study were dominated by pest attacks found on leaves, compared to insects found on stems and roots. Symptoms of pest attacks on leaves caused by biting or chewing activities carried out by pests and making plant leaves become hollow in the middle and on the edges of the leaves. Based on the results of calculating the intensity of pest attacks using the formula according to Triwibowo et al. [5].

From the results of the calculation of the attack intensity (IS) of pests on plants in Anggori, it was 21% and included in the category of Slight Damage (RR). This is in line with research conducted by Goughertya and Davis regarding the calculation of the intensity of the attack on the leaves of the *Diospyros celebicase* plant, which was 11.54%, including light damage [26]. In this condition, pest control does not need to be carried out because it is only lightly damaged. The same research was also conducted by Triwibowo et al. in his research on calculating the attack intensity on *Shorea leprosula* Miq plants of 29.5%, it is not necessary to take action for eradication, but it is very necessary to carry out prevention [5].

According to Wattimena et al. in his research on insect inventories and the level of damage caused to teak stands, said that factors originating from within the habitat itself that influence the presence and development of insects in a location are their ability to reproduce [8]. The amount of damage to yard plants is determined by several factors such as insect populations, parts of yard plants that are damaged, plant defenses against insect attacks and the growth phase of the plants themselves [5]. Factors that caused light damage to yard plants in Anggori were maintenance activities carried out by the community such as

pruning, logging, smoking, using stove ash and using liquid soap. The community does this to avoid further damage and also to reduce the number of insect populations in their yards.

Pest Attack Control

Pest attack is a problem that is often faced by all people who have yards planted with various types of productive plants. This can cause economic losses for the people living in Anggori who depend on livelihoods or as a source of food ingredients obtained from garden plants. Based on the results of interviews conducted with residents in Anggori, it was found that most of the local residents had implemented a pest control process in their yards, a picture of the percentage of pest control carried out by the community can be seen in Figure 10.

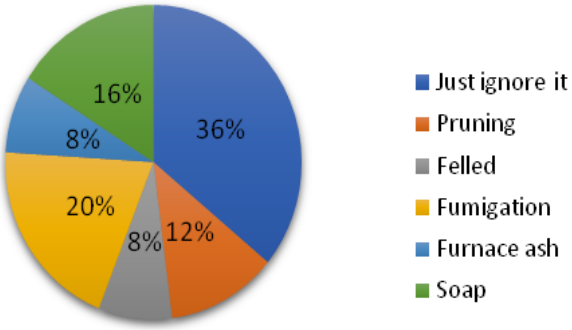


Figure 10. Percentage of pest attack control (%).

The people who live in Anggori usually carry out controls such as pruning by 12%, pruning is carried out by the community by cutting or cutting parts of plants that are attacked by pests. This is done in order to reduce the part of the plant that is attacked by pests so that the plants are free from pest attacks. This is in line with research conducted by Rahma et al. in his research said pruning of cocoa plants was done to open the canopy in order to reduce moisture on the plants so that the plants get even sunlight so that insect pests that are on cocoa plants are also reduced [27]. In addition to pruning, there are some people who cut down plants 8%. Logging carried out by the community is carried out because the community considers the plants that are attacked by pests no longer have economic value because pest attacks cause the fruit they produce to become ugly and unfit for sale.

Control by using smoke of 20%, the fumigation carried out by the people in Anggori functions as a repellent for insect pests that attack yard plants, the community will collect the remaining dry leaves and stems and fall on the ground and put them under near the plants that are attacked by attacks then the community will burn the leaves and dry sticks to make smoke. This is also in line with research conducted by Soedijo et al. in his research said that fumigation for 1 hour, 2 hours and 3 hours can cause death of *Rhyzopertha dominicas* imago by 50%, this is because the smoke contains carbon dioxide (CO_2) which can be used to kill insects that attack plants due to carbon dioxide [28]. CO_2 is a respiratory poison for insects and can cause death. The same research was also conducted by Wijayaratne et al. in their research said CO and CO_2 compounds produced from burning rice husks can cause pest death because CO accumulation can affect the insect's respiratory system [29].

The people who live in Anggori also use 8% of stove ash or ashes from burning residues for traditional pest control. The ashes from the burning stove will be sprinkled or spread evenly on the parts of the plants that are attacked by pests. This is in line with research conducted by Terkelin in his study which stated that the application of 2 tons/ha of rice husk ash to the attack intensity of white rice stem borer (PBPP/*penggerek batang padi putih*) tended to be lower, namely 2.23% compared to plants that were not given ash [30]. Rice husks tended to be higher at 4.20%, this was allegedly because the plants given the husk ash probably contained quite a lot of silicate so that the plants that were given the husk ash became more resistant to attack by PBPP.

There are also people living in Anggori who use soap to control pest attacks by 18%, any brand of soap or detergent available at home with any brand can be used to control or reduce plant destroying pests, because soap is an environmentally friendly insecticide and the effects resulting from its use very little soap. This is in line with research according to Vahabzadeh et al. in his study which also used dishwashing

detergent for head caterpillars, saying that larval death was at the lowest level of 33.33% with a concentration of dishwashing detergent solution of 0.50% and the greatest larval death was in the detergent concentration [31]. Washing dishes 4.00%, which is 41.66%. Soap with various brands such as liquid soap, hand washing soap, and detergents contain active ingredients, namely: salts and fatty acids which can destroy cell contents and cause dehydration in the pest's body resulting in death [31].

Conclusion

Based on the results of research conducted in Anggori, the residential area of Gunung Meja Nature Park, it can be concluded as follows; (1) the number of vegetation types in Anggori is 137 plants with a diversity index level of 2.956 which is in criterion 1≤H≤3, which means the diversity species index in Anggori is included in the medium category, (2) Plants in Anggori suffered damage caused by pest attacks, where the damage occurred such as: damage to leaves such as windows that occurred on *kedondong* plants, bite marks on water apple leaves, curling of leaves on citrus plants, galls on the surface of mango leaves, and leaf damage on ketapan, breadfruit and rambutan plants with holes in the leaves.The attack frequency (FS) was 50%, which means that the condition of the plants in Anggori's yard was categorized as Medium, and the attack intensity (IS) on plants in Anggori was 21% and included in the Light Damage condition (RR). The people who live in Anggori have carried out pest control measures such as 12% pruning, 8% logging, 20% fumigation, 8% stove ash and 16% soap as a way to eradicate pest attacks.

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