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Diversity of Pest Types and Natural Enemies in Plantations Sorghum (*Sorghum bicolor* L)

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ABSTRACT

The types of pests that attack sorghum plants are very diverse, ranging from the germination phase to harvest. This is the main obstacle in efforts to increase sorghum production. These pests have different behaviors, morphologies, and ecobiologies. The aim of this research is to identify all types of pests and natural enemies that disturb sorghum plants. This research was conducted on sorghum farming land in Pantai Gemi village, Stabat subdistrict, Langkat district, Medan, from March to July 2022. Morphological identification was carried out using the sweeping net method, yellow sticky traps, and pitfall traps. The results of the research showed that there were 126 weaver ants. (*Oecophlla Smaragdina*), 83 black ants (*Dolichoderus thoracicus*), and some of the pests that were caught and the least were 14 seed flies (*Atrigona soccata*) and 12 dragonflies (*Trithemis arteriosa*). is the type of pest that most often attacks sorghum plants. By identifying pests and natural enemies, it is hoped that we can control pests effectively and integratedly in sorghum cultivation.

Keywords: *Identification, Effectively, Pests, Predators, Production, Sorghum*

1. INTRODUCTION

Sorghum is plant Which potential For developed For support program diversification food And energy (Subagio And Aqil, 2013). As source food sorghum rich will content nutrition And diverse substance antioxidants and as a source of bioenergy surgum can replace needs material burn fossil as well as industry (Ardiyanti *et al.,* 2019). Request will sorghum every that year Keep going increase is an opportunity to fill in this need, but sorghum crop production is still low caused by pest attacks and disease (Firmansyah *et al* ., 2013) .

One of the threats to sorghum development in Indonesia is pests. The main pests of sorghum plants are *shoot flies* , grasshoppers , armyworms (*Myhtimna sp*), aphids (*Aphids*), stem borers (*Chilo partellus* and *Sesamia inferens*), *Heliothis armigera* , and *Calocoris anjustaties* (Subendi, A. 2010). Pest attacks on sorghum plants can reduce yields by up to 40% and even cause crop failure (Marwoto, 2013). Losses and loss of crop yields caused by pest attacks vary depending on the pest population in the crop, the part of the plant that is damaged, the plant's reaction to pest attacks, and the growth phase or age of the plant (Marwoto and Indiati 2017).

The failure of sorghum cultivation can be attributed to a lack of knowledge about the biology and behavior of sorghum pests (Ratnasari et al., 2019). The ability to monitor pests and control them is closely related to this knowledge. Therefore, to control pests better, knowledge about the forms of pests that attack plants, their behavior and their ecobiology is very necessary for farmers (Mas'ud, 2009). Until now, chemical pesticides were the only way to control pests. However, unwise use of chemical pesticides will damage the insect ecosystem, causing natural enemies to disappear and resistant insects to emerge. Therefore, farmers and implementing officers in the field must understand how to control pests (Soenartiningsih and Fatmawati, 2013).

Integrated pest management (IPM) is a methodology that contains basic principles which is the basis for farmers to create optimal conditions for environment plant so that pest No become problem (Ratnasari, *et. al.* , 2019) . IPM can synergize between component control Which in accordance For environment certain methods so that management results are better , approaches or methods think about control plant pest organisms Which based on base consideration ecology And efficiency economy in frame management agroecosystem Which insightful environment (Ratnasari *et al.* , 2019).

Based on description on so need done study to identify types pest Which There is in planting sorghum can made as enemy experience in effort control pest Which appropriate on cultivation plant sorghum .

2. MATERIAL AND METHODS

Time And Place

Study This held in village Beach Gemi subdistrict Stabat regency The province of North Sumatra is located at coordinates 3°45'46.9"N and 98°26'25.4 " E , with height 27 m above surface sea , held on month March – July 2022.

Material And Tool

The materials used are sorghum seeds, label paper, key books determination insect , 70% alcohol , yellow wood paint, paint thinner and glue . Tool used are raffia rope, 100 cm long stakes, magnifying glass, killing bottles, insect nets, Bottle collection insects, cameras And Garmin 64 S GPS

Method Study

Observation done with descriptive quantitative use method exploration, namely taking samples using traps in standing plots plant sorghum Which consists from 39 tree in a way visual with wide plots study 402 m^2 . All plant observed specifically on part plant Which attacked insect. Retrieve data by:

1. Taking insect with use trap sweeping net, yellow sticky traps and pitfall traps
2. Insect Which arrested identified and then classified until level family, based on Borror *et al* ., (1992) and Kalshoven (1981).
3. Observation identification will also pay attention representativeness group functional or taxonomic

Implementation Study

1. *Sweep net* or insect traps are used to catch small and soft insects with the principle of catching insects that fly or are active in the air using a net on a specified transect. This tool consists of two parts, namely a net made from plastic gauze and a holding stick made from aluminum (length 90 cm). The use of a sweep net can be done in two ways: swinging the pole in the direction of the insect you are looking for or sweeping the pole back and forth.
2. *Yellow sticky traps* are used to catch insects or pests in sorghum plantations. The yellow color was chosen because it is a contrasting color used by insects to differentiate the host plant from the surrounding environment. These traps are placed in plastic and embedded around the sorghum field at a height of around 120 cm so that they can work optimally. When trapped pests cover most of the surface of the trap or after 15 days of installation, the trap needs to be replaced with a new one
3. *Pitfall traps* are used to assess the density or abundance of soil macrofauna. This is an effective way to trap active insects on the ground during the day or night. The principle is to make a trap with holes that are used to catch ground animals that move above the surface or that happen to come into the trap. The device is baited, buried in the ground, and covered with a rainproof cover. The "anti-freeze" fluid in the device ensures that the insects are trapped and cannot escape. This tool is left for 2 days after which it needs to be done replacement with traps new .

Yellowsticy traps and pitfalltraps *in* the research field were placed in plant rows 5, 6, 7, 8, and 9. The layout of the trap installation positions in the research field is presented in Figure 1.

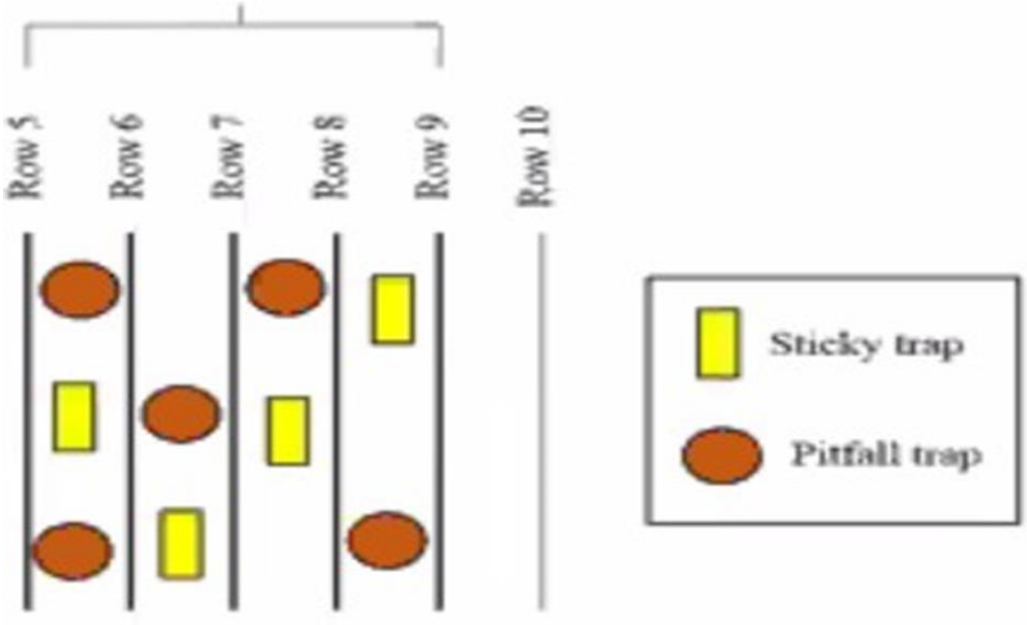

Figure 1 . Lay out Study

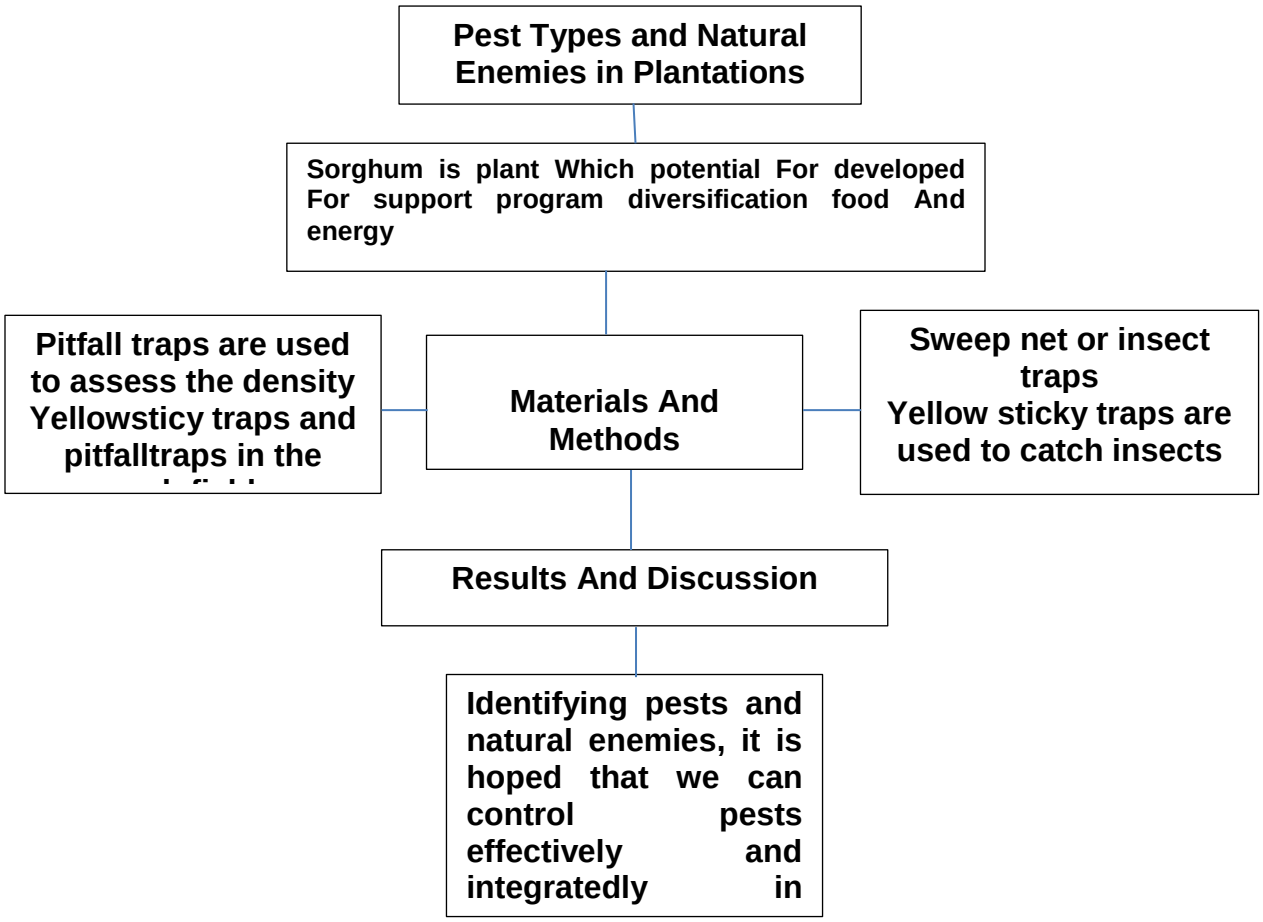

Figure 2. Stages of Research Pest Types and Natural Enemies in Plantations

3. RESULTS AND DISCUSSION

Based on the results of data collection observations insect with use trap sweeping net, yellow sticky traps and pitfall traps, Insects Which arrested identified and in classify until Order, class, species levels , based on Borror et al. (1992) and Kalshoven (1981). The results obtained in the field are the type of pest, level of attack and methods of controlling sorghum pests, which are carried out appropriately according to the target . Pests found in age 7, 14, 21, 28 , 35 and 50 days after planting (DAP) can seen in Table 1.

In table 1, the level of pest presence at age 7, 14, 21, 28, 35 and 50 HST can be seen at any time when observations are made of the growth of the most frequently found pests, namely weaver ants (*Oecophlla Smaragdina*) 126, black ants (*Dolichoderus thoracicus*) 83 and the least found are seed flies (*Atrigona soccata)* 14 and dragonflies (*Trithemis arteriosa* **)** 12 . From the results of data analysis, it is known that the level of pests found on sorghum plants can be seen in Figure 3.

Based on the histogram in Figure 3, the highest number of pests on sorghum plants is found on weaver ants with a value of 126, then black ants with a value of 83 and fire ants with a value of 44, while the lowest number of pests on sorghum plants are seed flies with a value of 14. Weed ants is the largest number of pests in the research area, this is because ants like to target the sweet dirt produced by insects on sorghum plants. The results of Falahudin (2012) state that ants Rangrang (Oecophylla smaragdina) almost 85% of the colony can eat fireworms (Setora sp) naturally in oil palm plantations , while the other 15% of pests are insects. The number of pests based on days after planting found on sorghum plants can be seen in Figure 3.

Table 1. Level of pest presence at age 7, 14, 21, 28, 35 and 50 HST in sorghum plants

No	Species	HST						Amount
		7	14	21	28	35	50	
1.	Snail (*Achatina fulica)*	20	15	-	-	-	-	35
2.	Black Ant (*Dolichoderus thoracicus*)	18	15	15	15	15	15	83
3.	Weaver ants (Oecophlla Smaragdina)	26	20	20	20	20	20	126
4.	Fire Ant (*Solenopsis invicta)*	4	8	8	8	8	8	44
5.	Seed fly (*Atrigona soccata)*	8	6	-	-	-	-	14
6.	Fruit fly (*Drosophila melagonaster*)	-	4	4	4	4	4	20
7.	Kurbit leaf beetle (*Aulacophora femoralis*)	-	4	4	8	4	4	24
8.	Leaf caterpillar (*Helicoverpa armigera*)	-	4	4	4	4	4	20
9.	Green steamed grasshopper (*Atractomorpho crebulate)*	-	7	7	7	7	7	35
10.	Twin grasshopper (*Locusta migratoria)*	10	6	6	6	6	6	40
11.	Dragonfly (*Trithemis arteriosa*)	-	4	-	-	4	4	12
	Amount	86	93	68	72	72	72	

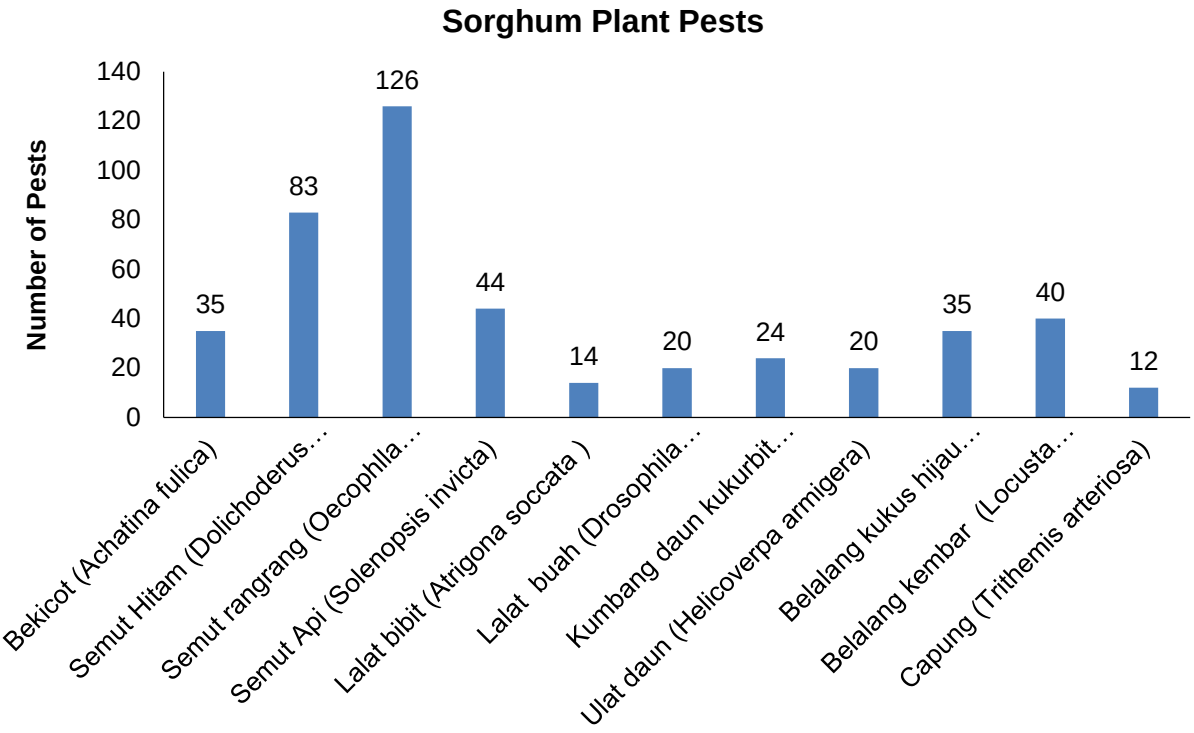

Figure 3 . Histogram of the Number of Pests on Sorghum Plants

Based on the histogram above, the highest number of pests on sorghum plants is found on weaver ants with a value of 126, then black ants with a value of 83 and fire ants with a value of 44, while the lowest number of pests on sorghum plants are seed flies with a value of 14. Weed ants is the largest number of pests in the research area, this is because ants like to target the sweet dirt produced by insects on sorghum plants. The results of Falahudin (2012) state that ants Rangrang (Oecophylla smaragdina) almost 85% of the colony can eat fireworms (Setora sp) naturally in oil palm plantations , while the other 15% of pests are insects.

The number of pests based on days after planting found on sorghum plants can be seen in Figure 4.

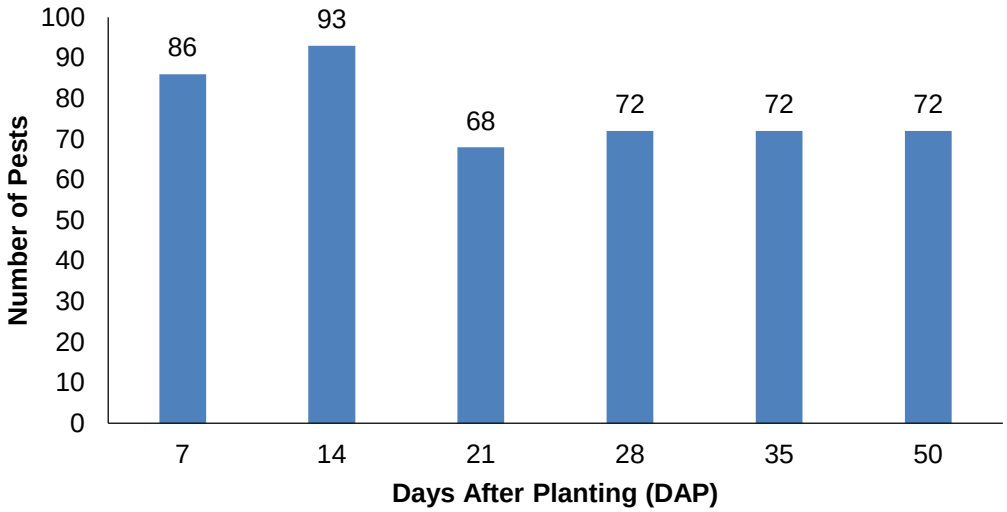

Figure 4. Number of pests based on Days After Planting (DAT)

Based on Figure 4 above, the highest number of pests on sorghum plants based on days after planting is at 14 HST. Weaver ants (*Oecophylla smaragdina*) eat insects or use sorghum plants as a source of food because in the vegetative phase, when the young leaves of the sorghum plant appear, they are rich in plant nutrients and are still soft, they are easier to enter the stem of the plant which contains the sweet taste of sorghum stems. and also used by ants Weaver ants (*Oecophylla smaragdina*) make their nests by knitting fine threads in the form of liquid from the mouths of weaver ant larvae to tie and roll plant leaves, this is the reason why weaver ants make their nests not in the ground. The total percentage of pests caught with several traps in sorghum plantings is presented in Table 2 below.

Table 2. Total percentage of pests caught in sorghum plantings

No	Species	Total	Percentage
1.	Snail (*Achatina fulica)*	35	7.73
2.	Black Ant (*Dolichoderus thoracicus*)	83	18.32
3.	Weaver ants (Oecophlla Smaragdina)	126	27.81
4.	Fire Ant (*Solenopsis invicta)*	44	9.71
5.	Seed fly (*Atrigona soccata)*	14	3.09
6.	Fruit fly (*Drosophila melagonaster*)	20	4.42
7.	Kurbit leaf beetle (*Aulacophora femoralis*)	24	5.30
8.	Leaf caterpillar (*Helicoverpa armigera*)	20	4.42
9.	Green steamed grasshopper (*Atractomorpho crebulate)*	35	7.73
10.	Grasshopper twins (*Locusta migratoria)*	40	8.83
11.	Dragonfly (*Trithemis arteriosa*)	12	2.65
	Amount	453	100.00

In table 2, the highest total percentage of pests caught in sorghum plantations was 27.81%, namely weaver ants (*Oecophlla Smaragdina*), 18.32%, Black Ants (*Dolichoderus thoracicus*), and the lowest were seed flies (***Atrigona).*** *soccata)* 14%, and dragonflies (*Trithemis arteriosa* **)** 2.65%. The total percentage of pests trapped in sorghum plants is presented in Figure 5.

Based on Figure 5, the total percentage of pests is dominated by weaver ants (*Oecophlla Smaragdina).* This is due to the reproduction of black

ants from eggs to larvae, which takes around 60 days to become adult ants, so the ant colony at the research location resulted in the number of black ants being caught far more than other pests. weaver ant (*Oecophlla Smaragdina)* will function as a biological control agent if its population in the cocoa ecosystem is abundant.

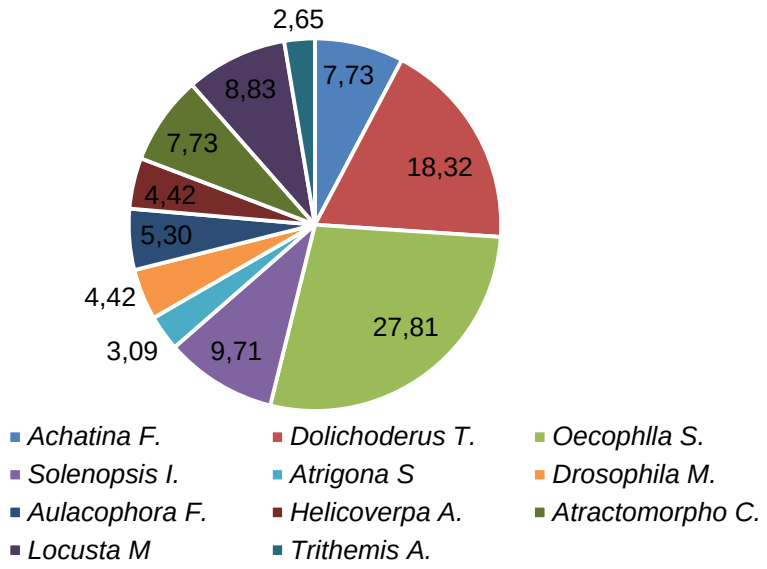

Figure 5 . Diagram of the total percentage of pests caught in sorghum plantings

Apart from weaver ants (*Oecophlla Smaragdina)* There are also black ants (*Dolichoderus thoracicus*) in sorghum plantings. The presence of these ants can suppress insects and other animals in sorghum plantations or can indirectly suppress the development of pests (Miles, 2017). The results of research by Robika (2020) show that black ants are used as natural enemies or predators to control the cocoa fruit borer (PBK) pest *(conopomorpha cramella)* which attacks the fruit of cocoa plants, causing damage to the fruit and pulp. Ridwan et al., (2020) have done the same thing to control pests *Helopeltis* spp causes rot on fruit that can lower results , with do control in a way experience planted can maintain lost production until with 80%.

Types, level of attack and control of pests on sorghum plants

1. Snail (*Achatina fulica*)

The classification of snails is *gastropod class* a order *s tylomatophora* family *Achatinidae* Genus Achatina species Achatina fulica (Barker, 2001) . The class gastropod is defined as gastro means stomach while poda means foot, thus snails are called stomach-footed animals. Snail morphology, soft body shell structure . The body weight of snails is around 200 grams and the body length is 130 mm (Nurhadi and Febri, 2018) . Usually during the day snails always hide themselves in their shells in damp locations to rest or sleep and are active at night . The level of snail attack is to eat young roots, new shoots and viable leaf buds cause death in plants sorghum (Hoffman , *et al* ., 2014) . Control of snails can be caught at night and destroyed, apart from that, by cleaning up rubbish and weeds in sorghum plantings, the snails do not have the opportunity to nest and hide, while for chemical control using 67% Fentin acetate with a concentration of 1.5 g/L sprayed on parts of plants and areas suspected of harboring snails (Hadi, 2018).

2. Black ants (*formicidae*)

Black ants on sorghum plants are classified as insects in the order *Hymenoptera* and family *Formicidae (* Blüthgen , *et, al* ., 2002 *)* , with the genus *Dolichoderus* (Abtar *et al* ., 2013). The

ant's body morphology consists of a head, mesosoma (thorax), and metasoma (abdomen), with features such as antennae, metapleural glands, and a narrow waist between the mesosomes (Zainul, 2014) . Ants reproduce by laying eggs. Ants can act as predators to control pests, decompose soil organic matter and help with plant pollination (Falahudin, 2013). One of the biological control techniques is by utilizing biological control agents in the form of black ants as natural enemies or predators for *Helopeltis* sp pests. Predatory black ants and biological control agents are quite efficient in controlling the main pests on plants (Surya, 2016). Ningsih (2019) if the types of ants and their diversity are high, the environmental ecosystem tends to be stable. Apart from the benefits, black ants also have a bad impact on plants, plant growth is hampered due to plant parts being used as nests (Falahudin, 2013). Control of black ants (*formicidae*) can carried out by integrated control using mechanical (trapping) and chemical methods (Murnawati et al., 2018). Trapping is carried out by installing bamboo that has been treated with coffee leaf litter and sugar cane molasses, this method is effective for controlling black ant pests (Astri et al., 2018) while chemical control is by spraying Metomil 40% systemic insecticide with powdery contact and gastric poison.

3. Weaver ants (*Oecophlla)*

Weaver ants on sorghum plants are classified as insects in the order *Hymenoptera* and family *Formicidae (* Blüthgen , *et, al* ., 2002 *)* , with the genus *Oecophlla* (Abtar *et al* ., 2013). The body morphology of ants consists of three parts, namely the head, mesosoma (chest), and metasoma (stomach). has antennae , metapleural glands , and a second abdominal part that connects to the ant stalk to form a narrow waist between the mesosoma (Zainul, 2014) .

Weaver ants (*Oecophlla*) can be used as a biological indicator, namely as a tool for monitoring changes in the quality of the environment as well as determining conservation areas and as a predator in controlling pests that attack these plants. Weaver ants (*Oecophlla*) known as *Weaver ants* or weaver ants , especially on large trees that have wide and flexible leaves, or they can also be small but dense leaves. Weaver ant eggs are called kroto . Manual control can be done by burning weaver ant (*Oecophlla*) nests. Meanwhile, with chemical control of weaver ants (*Oecophlla*) often use contact insecticide in the form of dimethoate 1.5 ml/l after disturbing the nest. Chemical sprays are intended to eliminate nests caused by weaver ants (*Oecophlla*) is a biological agent.

4. Fire ants (*Solenopsis invicta)*

Fire ants on sorghum plants are classified as insects in the order *Hymenoptera* and the family *Formicidae (* Falahudin, 2013 *)* , with the genus *Dolichoderus* (Abtar *et al* ., 2013). The body morphology of fire ants consists of a head, mesosoma (thorax), and metasoma (abdomen), with features such as antennae, metapleural glands, and a narrow waist between the mesosomes (Zainul, 2014) . Ants are divided into three types of ants queen, male, soldier and worker. Fire ants are easier to find because they can live in logs, open agricultural land, grasslands, by making mounds 25 – 60 cm high (Ningsih, 2019) . The role played by fire ants is so important that it is said that fire ants (*Solenopsis invicta)* extinction, thousands of species of animals and plants will become extinct. Even more than that, almost all land ecosystems will weaken due to reduced ecosystem complexity (Surya, 2016). Although the visible presence of ants does not directly disturb sorghum plants, they often build nests in plants and can damage roots, causing plant death (Asikin, 2014) . Control of fire ants (*Solenopsis invicta)* often uses synthetic insecticides such as magic lime containing 0.6% deltamethrin, which acts as a contact insecticide. (Diez *et al* ., 2009).

5. Seed Fly (*Atherigona soccata*)

Seed flies, which are classified as insects in the order *Diptera* , family *Muscidae* , genus *Atherigona* , and species *Atherigona soccata* (Allwood , 1998) , are pests of sorghum plants. The morphology of seed flies includes small size (3-4 mm), a shape similar to a small house fly, and a grayish black color. Eggs laid by female insects on sorghum plants hatch into larvae in 2-3 days, then turn into pupae in 10-12 days before becoming adult flies. (Kordali *et al* ., 2008) . Seed fly attacks mainly occur on young sorghum plants, causing plant damage and death due to the activity of the larvae which make holes in the stems (Subendi, 2010) . Control of seed flies (*Atherigona soccata*) can be done with technical culture such as cleaning the plant area from weeds and planting after rain, as well as using insecticides such as *carbofuran* and *fensulfothion* (Zulaikha *et al* ., 2011)

6. Fruit fly (*Drosophila melagonaster*)

Fruit flies, classified in the class Insecta, order *Diptera* , family *Drosophilidae* , genus *Drosophila* , and species *Drosophila melanogaster (* Allwood , 1998) , have a morphology with a brownish yellow body and a black ring motif on the back of the body, with a small size of 3-5 mm (Suharsono and Nuryadin, 2019) . Fruit flies attack fruit by laying eggs under the skin of the fruit, and after a few days, the eggs turn into larvae which damage the flesh of the fruit which can cause rot and bacterial contamination (Nismah , 2008) . Fruit fly larvae can be potential pests that cause fruit damage and loss, reducing the quantity and quality of fruit (Isnaini , 2013) . Fruit fly control (*Drosophila melagonaster*) can be done with sanitation, namely burying the infected fruit inside land For prevent its spread (Mujiayanto , 2013) . Chemical control uses contact insecticides with the active ingredients methomyl, cypermethrin and chlorpinfos which can be applied in the form of traps, or also used as an adhesive for fruit fly pests to destroy fruit flies without leaving residue in the fruit (Hasyim et al., 2010) .

7. Kurbit leaf beetle (*Aulacophora femoralis*)

Kurbit leaf beetles are classified in the class *Insecta* , order *Coleoptera* , family *Chrysomelidae* , with the genus *Aulacophora* and the species *Aulacophora femoralis* (Abdullah, 2009) . The morphology of this beetle imago is 7 mm in size, yellowish in color, with an abdomen that tapers backwards (Falahudin *et al. al* ., 2012) . The beetle eggs are laid on the ground near the plant, and the larvae eat the root tissue of the sorghum plant, while the adult beetles eat the leaves, characterized by the damage they cause, making holes on the edges and middle of young leaves that spread 1-2 mm, or in intensity. High level attacks only leave the leaf veins on the flower part of the plant (Sutarma, *et al* ., 2022) . Larvae can also damage plant roots and stems. Natural control of (*Aulacophora femoralis*) involves catching, rotating or rotating crops, cultivating the soil so that the eggs are exposed to sunlight, using mulch to prevent egg laying, sterilizing the soil, and using natural enemies such as black ants. Chemical control can be done with insecticides such as profenofos and chlorophyrifos 5 ml/l of water sprayed in the morning on the affected plant parts (Arsi, 2021).

8. Twin grasshopper (*Locusta migratoria)*

Twin grasshoppers are classified as *insects* in the order *Orthoptera* , family *Acrididae* , with the genus *Locusta* and the species *Locusta migratoria* (Agus, 2017). Its body morphology consists of three parts: abdomen, chest and head, has two pairs of wings and three pairs of legs. Adult twin grasshoppers have hard front wings and thin hind wings, with a body length of 4-7 cm (Hamim, 2003) . Twin grasshopper (*Locusta migratoria)* lays eggs in the soil, with a life cycle of

around 76 days (Marwoto and Suharsono, 2017) .

Attacks by twin locusts can cause damage to plants, such as tearing of the edges, middle of the leaves and even leaving only the bones of the leaves in more severe attacks (Rosma, 2005) . Control of twin grasshoppers (*Locusta migratoria)* This can be done through technical culture, namely plowing land, crop rotation, using mulch, fertilizing, regulating drainage, sanitizing agricultural land, using biological control agents such as pathogenic fungi, and using chemical insecticides such as acepat, diazinon, delametrin and carbosulfan according to the recommended rules or doses. , insecticide spraying is carried out in the morning (Riyanto, 2018) .

9. Green steamed grasshopper (*Atractomorpho crebulate)*

The green steamed grasshopper, which is classified in the class *Insecta* , order *Orthoptera* , family *Pyrgomorphidae* , genus *Atractomorpha* , and species *Atractomorpha crenulata* (Agus, 2017) , has a morphology with all parts of the body green, a pointed head, and two pairs of antennae that function as sensory organs. for smelling, showing the way, and hearing (Tohir, 2010) . Its life cycle can change color from green to brown when the temperature increases, indicating the ability *to polymorphism* (Riyanto, 2018) . This grasshopper eats the young leaves of plants, leaving half of the leaves where it eats. Control of green steamed grasshopper (*Atractomorpho crebulate)* This can be done by cultivating the soil so that grasshopper eggs are exposed to sunlight and die, sanitizing weeds so they are not used as food, burning rubbish, and chemical control using insecticides such as acepat, diazinon, delametrin and carbosulfan, spraying carried out in the morning (Rosma, 2005).

10. Leaf caterpillar (*Helicoverpa armigera*)

Leafworms, classified in the class *Insecta* , order *Lepidoptera* , family *Noctuidae* , with the genus *Helicoverpa* and the species *Helicoverpa armigera* , have the morphology of a yellowish-brown moth with black spots and lines (Kalshoven , 1981) . Male imagos have round reddish spots, while female imagos are reddish brown without spots. The eggs are brownish yellow and hatch in 2-4 days. Larvae have 5-7 instars, generally 6 instars, with skin development (moulting) in each instar for 2-4 days (Hasyim *et al* ., 2010) . Larva attacks. armigera is difficult to spot and difficult to control with insecticides because it is covered in cloves. This attack can cause yield losses in sorghum plants of up to 80% (Laoh , *et, al* ., 2003) . Control of leaf caterpillars (*Helicoverpa armigera*) is carried out through tillage by plowing to destroy the pupae in the soil, using mulch to prevent the caterpillars from laying their eggs in the soil, crop rotation or rotation and utilizing natural enemies such as spiders and *Staphylinidae predators* which can consume around 15 eggs (Utami , 2010). Control in a way chemistry done If attack pest caterpillar leaf Already exceed threshold , control done with do spraying solution chemical insecticides such as acetate, diazinon, delametrin and carbosulfan with dose 3 c/liter of water. Insecticide spraying is given to all affected parts of the plant, spraying is carried out in the morning.

11. Dragonfly (*Trithemis arteriosa*)

Dragonflies are classified in the class *Insecta* , order *Odonata* , with the suborders *Anisoptera* and *Zygoptera* . The species described is *Trithemis arteriosa* (Safitri, 2014). The morphology of the dragonfly has an elongated body with two pairs of transparent wings, consisting of the head, wings, legs, abdomen and thorax (Saputri , 2013) . Dragonflies have an important role in the ecosystem because they function as predators with their sharp jaws, wide vision, and flying speed of 30 miles per hour (Anggraini *et al.,* 2023) . Dragonflies can prey on various types of insects and other organisms and can maintain the

balance of the food chain (Ilhamdi, 2012) . Dragonflies are also considered an indicator of ecosystem quality, can eat pests, and have the ability to consume prey up to 15% of their body weight every day. Apart from that, large dragonflies can be used as indicators of clean water (Suriana *et al* ., 2014) .

The main pests that attack sorghum plants are the dominant Weaver Ants *(Oecophylla smaragdina*), which live in colonies in circles around the stems and curled up plant leaves, while the dominant natural enemies found in this study are black ants (*Dolichoderus thoracicus) and dragonflies* (*Trithemis arteriosa*).

CONCLUSION

The types of pests and natural enemies in sorghum plantations in Pantai Gemi Langkat Village, Medan are Snails (*Achatina fulica)* , Weaver Ants *(Oecophylla smaragdina),* Black Ants *(Dolichoderus thoracicus),* Fire Ants *(Solenopsis invicta),* Seed Flies *(Atrigona soccota),* Fruit Flies (*Drosophylla melanogaster),* Kukurbit Leaf Beetle *(Aulocophora femuralis),* Leaf Caterpillar (*Helicoverpa armigera),* Green steamed grasshopper *(Atractomorpho crebulate), Twin grasshopper (Locusta migratoria), Dragonfly (Tritemis arteriosa)* . The insect pests that are most often caught and trapped are Weaver Ants *(Oecophylla smaragdina*) while Black Ants (Dolichoderus thoracicus) are their natural enemies.

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