

The Effectiveness of Trap Colors Against the Catch of Rice Plant Pests

Idum Satia Santi^{12*}, Erick Firmansyah¹, Bayu Muhlin Febrian¹, Herry Listianto²

¹Agrotechnology Study Program, Faculty of Agriculture, Institut Pertanian Stiper Yogyakarta, Indonesia

²Akademi Komunitas Perkebunan Yogyakarta, Indonesia

*Corresponding author: idum@instiperjogja.ac.id

Article History: Received: 29 December 2022, Final Revision: 6 January 2023, Accepted: 13 January 2023, Online Publication: 20 January 2023

ABSTRACT

The use of traps is one of the environmentally friendly pest controls. Insects have a preference for the colour of objects. The research aims to determine trap colours' effectiveness in catching rice plant pests. The research was conducted from June to July 2021 in Depok, Sleman Regency, Yogyakarta Special Region. The study used a descriptive observational method on an 8-week-old rice planting area. The colour traps used are white, red, green, yellow, and blue. The experiment used a completely randomized design with five replications. The results showed that the yellow trap produced the most insect catches, namely 545 insects, and the white colour produced the lowest catch of 74 heads. Pests that are heavily trapped in a row from the most to the least are *Hydrellia* sp, *Leptocorisa oratorius*, *Nephotettix virescens*, *Pareaucosmetus* sp, and *Nilaparvata lugens*. The most trapped is *Hydrellia* sp, as much as 78% of the total trapped insect pests. Effective trap installation time in the morning.

Keywords: Color, trap, pest, rice, preference

INTRODUCTION

Rice (*Oryza sativa*) is an important food crop that is a staple food source in various parts of the world, especially Indonesia. Plant-disturbing organisms are a problem that can decrease rice crop production. Some pests that attack rice plants include *Nilaparvata lugen*, *Leptocoriza acuta*, *Nephotetix virescen*, *Nymphula depunctalis*, etc. Conventional rice pest control relies heavily on chemical insecticides because it quickly reduces pest populations. Many side effects of insecticides are good for health and environmental safety.

Integrated pest control that is

environmentally friendly began to be widely developed, such as using pheromones, traps, refugia, etc. The use of color traps is widely used as an alternative to insect pest control in agriculture and plantations, as well as a tool for monitoring pest populations. Studies were done to see how the color, form, and size of visual sticky traps affected the behavior of female oriental fruit flies, *Bactrocera dorsalis* (Hendel), and two fruit fly parasitoids, *Fopius arisanus* (Sonan) and *Diachasmimorpha longicaudata* (Ashmead) [1]. *Rhabdoscelus obscurus*, as a borer pest of sugarcane, coconut, and ornamental palm stalks

can be controlled using a combination of pheromones and brown color traps [2]

This study wants to examine the use of colour traps against insect pest catches on rice

MATERIALS AND METHODS

The study used a descriptive exploration method by placing white, yellow, red, green, and blue traps on 8-week-old rice plants in the vegetative phase before the generative. Each colour trap was repeated five times with random sample placement. A sampling of 40 meters² in the Maguwoharjo area, Depok, Sleman, Yogyakarta. The experiment was conducted from June to July

plants. In addition, to find out the dominant pests on the rice field. Hopefully, in the future, this method can be used as an alternative to agricultural and plantation pest control.

2021.

Planks measuring 25 x 10 cm were made as traps. The height of the trap was 1 meter. Observations were made from 07.00 to 12.00 WIB and 13.00 to 17.00. Caught insects were identified using the identification key Borror and de Long (1997).

RESULTS AND DISCUSSION

The results showed several insect pests in the rice fields in Maguwoharjo, Depok, Sleman. In this study, only five of the largest insect pests were

taken for data processing. Field captures can be seen in Figure 1

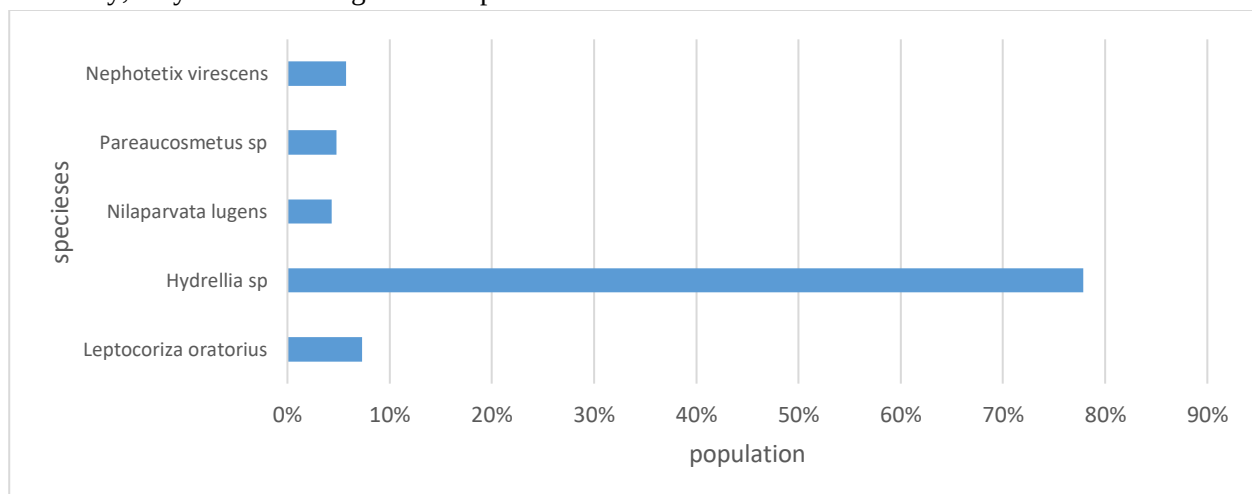


Figure 1. Percentage of insect pests in paddy

Five insect pests were caught, including *Leptocorisa oratorius*, *Pareaucosmetus sp.*, *Nephottetix virescens*, *Nilaparvata lugens*, and *Hydrellia sp.* *Hydrellia sp.*, or seed flies, is the largest insect pest caught (78%) and attacks many young rice plants. Many of these pests appear in the vegetative phase of rice planting. Pest stadia that attack are larvae by gnawing the young leaves that are still curling and attacking to the point of growth. These insects are still considered minor but

poorly controlled; they can turn into potentially harmful pests [3]. *Hydrellia philippina* flies infestation rate on IR36 and IR40 rice, as many as 800 flies on 49 rice clumps, can cause 82% leaf damage but does not reduce grain yields [4].

Green leafhoppers (*Nephottetix virescen*) and brown leafhoppers (*Nilaparvata lugens*) are also found in the field. Leafhoppers attack the stem part of the rice plant and sometimes as a virus vector. Nevertheless, the population of both is still

below the economic threshold. Both are caught on all color traps, but most are still in yellow traps.

The paddy fields used are about 8-9 weeks old, so some enter the ripening phase. *Leptocoriza oratorius* (Hemiptera: Alydidae) is a stabbing and grain-sucking insect in the milk-ripening phase. This insect damages the plant when it reaches the flowering phase until milk ripens. The damage

causes the rice to change color and whitewash, and the grain becomes empty. Both nymphs and adult stadia cause serious damage to rice crops. It has five instars, greenish when young and brownish when mature. Its life span is about 50 to 83 days [5]

Furthermore, the results of insects caught in color traps can be seen in Table 1.

Table 1. The number of insect pests caught in the colour traps

trap colour	number of insects caught					Total	average
	1	2	3	4	5		
white	17	12	13	15	17	74	14.8 c
red	38	52	48	47	31	216	43.2 bc
green	16	23	31	24	34	128	25.6 bc
yellow	126	101	104	112	102	545	109 a
blue	14	16	25	31	17	103	20.6 c
Total	211	204	221	229	201	1066	

Traps with yellow colour give the most catch compared to other trap colours. Some insects, such as leafhoppers, are attracted by colours such as yellow, red, and green. However, each type of leafhopper can have different preferences for different colours. Different leafhopper species showed distinct preferences for specific colours that varied in intensity along a spectrum of wavelengths and RGB values. Green was the most attractive colour for blunt-nosed leafhoppers, followed by red and yellow, while sharp-nosed leafhoppers preferred yellow, green, and red [6]. Flies use visual cues and signals to locate food sources, hosts, and mating partners [7]

The blue object attracts the flight of the fly *Glossina palpalis* to approach, and the white colour affects the landing of insects; some flies will land on a white surface (77%) [8]. In the *Stomoxys calcitrans* trap experiment, the blue colour caught more flies than the orange and white colours [9].

In general, the catch of insects in color traps can be seen in Figure 4 below

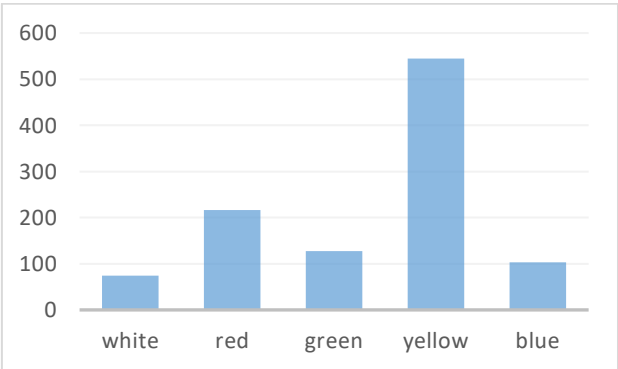


Figure 2. The number of insects caught in the colour traps

Some insects have a fondness or choice of color. The use of yellow sticky traps in greenhouses can suppress the development of *Bemisia tabaci* populations and catch more aphids than in the field [10]. The use of fruit pest traps *Drosophila suzuki*, with open traps of red and black color gives more catch than yellow traps [11]. The use of yellow and green trap variations had no noticeable effect on the catch of Asian citrus psilid (*Diaporina citri*) in Florida and Texas [12]. The use of yellow ball traps for trapping female flies of *Bractocera dorsalis* has a significant influence compared to other colors [1]. Flies have a complicated visual system that includes four spectrum classes of photoreceptors contributing to

color perception [13]. Hoverfly Imagoes, *Eristalis tenax*, are reported to have a preference for yellow flowers, i.e., they like to visit yellow flowers and extend their proboscis to yellow colours [14]

caught in the color traps can be seen in Figure 3 below.

For more details, the species of insect pests

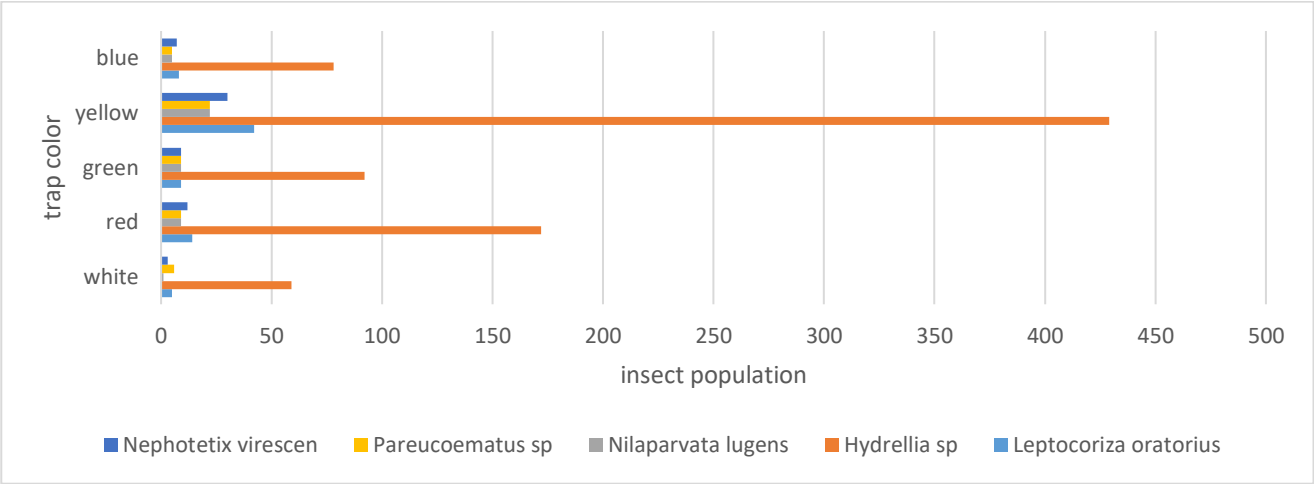


Figure 3. Types of insects caught on color traps

From the data in figure 3, all colors can be used to trap insects, but most are caught in yellow traps. *Hydrellia sp* is the dominant pest in the field, so it is caught on all color traps in higher numbers

than others. The research on *Oryctes rhinoceros* as a pest of oil palm plants showed that the trap colour did not significantly affect the catch and sex ratio of the imago. All colors can be used to trap imago [15]

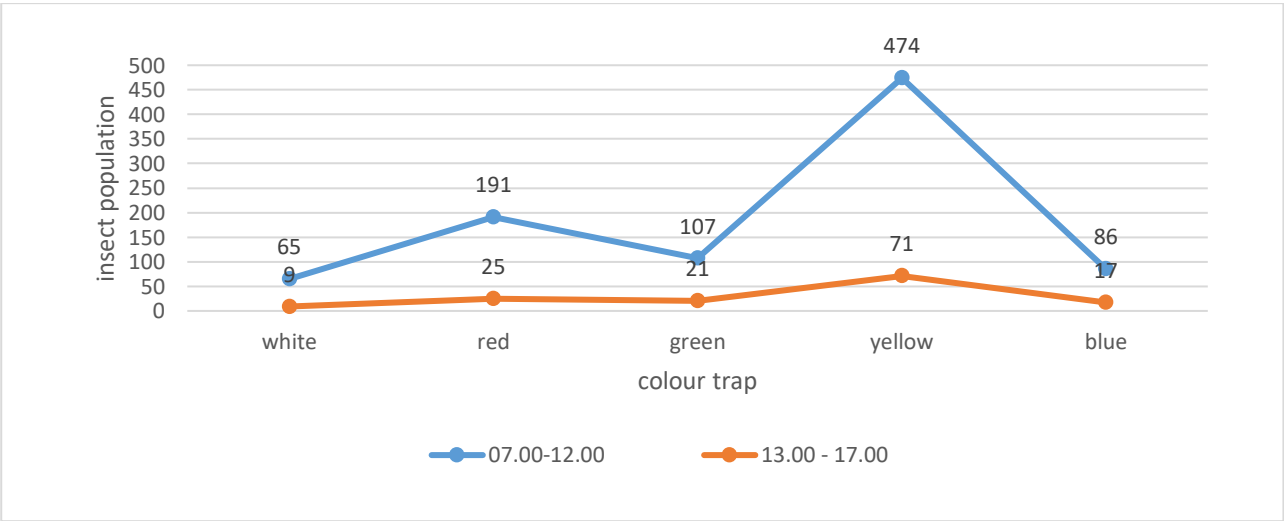


Figure 4. The timing of catching insects

More insects were caught in the morning on all color traps (Figure 4). Insects are more active in the morning than in the afternoon, especially diurnal insects. Diurnal insects

require high light intensity for activities. They look for sources of feed, lay eggs, visit flowers, and look for hosts and mates from 08.00 - 11.00 am. Most flowers bloom in the morning. Many diurnal insects are attracted to the

yellow color. The use of yellow traps is widely used as a means of insect control [16].

CONCLUSION

The results showed that five insect pests were caught, namely *Leptocoriza oratorius*, *Nilaparvata lugens*, *Nephotetix virescens*, *Hydrellia* sp, and *Pareaucosmetus* sp. *Hydrellia* sp was the

most insect caught (78%). Yellow color traps get the most catches of insects, especially in the morning.

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