IBJ
Indonesian Biodiversity Journal
http://ejurnal.unima.ac.id/index.php/ibj

indonesian.biodivers.j.
Vol. 5, No. 1. April 2024
ISSN : 2722-2659

ANALYSIS OF DOMINANT NUMBER VALUES WEED POPULATION IN PADDY RICE CULTIVATION (Oryza *sativa*, L.) IN KOYA VILLAGE, MINAHASA, NORTH SULAWESI

Yuriko Kasim[1], Anatje Lihiang[2], Sukmarayu P. Gedoan[3*], Meity Tanor[4], Aser Yalindua[5], Herry Sumampouw[6], Nicky Tumalun[7]

[1,2,3,4,5,6] Program Studi Magister Biologi, FMIPAK, Universitas Negeri Manado, Sulawesi Utara, Indonesia
[7]Program Studi Matematika, FMIPAK, Universitas Negeri Manado, Sulawesi Utara, Indonesia.

**Corresponding author: sukmagedoan@unima.ac.id*

Received: December 5, 2023 *Accepted: April, 2024*

Abstract

Paddy rice is the main food crop in Indonesia because rice is the primary food source of the Indonesian people. However, it faces obstacles caused, among others, by the presence of nuisance plants, namely weeds, that can reduce the quantity and quality of harvest or production. This study examines the value of the dominant Number of weed populations in rice field cultivation. The research method used was weed observation with analysis of the chief number value, using the square of a sample plot measuring 50 cm x 50 cm, randomly placed on the experimental land. The dominant number value analysis was carried out four times at the beginning of the study as an initial vegetation analysis, 21 DAP observations, 45 DAP observations, and 60 DAP observations. The results showed that the weed species with the highest Dominant Number Value at initial words in paddy fields were *Paspalum disticum, Fibristylis litoralis, Marsilea crenata, Cyperus iria,* and *Ludwigia octovalvis*; weed species with the highest Dominant Number Value at 21 DAP observations were *P. disticum, Echinochloa crusgalli, F. litoralis, M. crenata,* and *Leersia hexandra*; The weed species with the highest Dominant Number Value at 45 DAP observations were *P. disticum, F. litoralis, C. iria, E. crusgalli,* and *Leersia hexandra* and the weed species with the highest Dominant Number Values at 60 DAP observations were *E. crusgalli, P. disticum, F. litoralis, Scirpus juncoides, and S. juncoides.*

Key words: *Weeds, dominant number value, rice paddy*

INTRODUCTION

Paddy rice is the main food crop in Indonesia because rice is the primary food source of the Indonesian people. Efforts to increase rice production are critical to meet rice needs. The business faces obstacles caused, among others, by the presence of nuisance plants, namely weeds, that can reduce the quantity and quality of harvest or production. Weeds interfere with the growth of cultivated plants or harm human interests, so humans try to control them (Sembodo, 2010; Kilkoda et al., 2015). Types of weeds include grass weeds, sedge group weeds, and broadleaf group weeds. Weeds inhibit plant growth in addition to natural, genetic, and plant cultivation factors (Kilkoda et al., 2015). Weed disturbance can

indonesian.biodivers.j.
Vol. 5, No. 1. April 2024
ISSN : 2722-2659

cause stunted plants, yellowing leaves, and low production (Najiyati & Danarti, 2003; Solahudin et al., 2010; Palijama et al., 2012; Sari & Rahayu, 2013; Purnamasari et al., 2017; Tampubolon et al., 2018). The losses caused by these weeds can be quantitative, in the form of numbers, or can be realized with numbers, and qualitative losses in the form of quality of agricultural products that cannot be recognized with numbers (Sari & Azis, 2021).

In the plant life cycle, there is a period that is very vulnerable or often referred to as a critical period, when in that period, cultivated plants are susceptible to nutrient deficiencies and the presence of weeds (Tjitrosoedirdjo et al., 1984; (Sukman &; Yakup, 2002). The presence of weeds can poison cultivated plants because weeds can secrete *allelopathy*.

If the weed is not controlled, it can affect the growth of cultivated plants, reduce production yields, and even cause death. Losses in cultivated plants caused by weeds, if allowed to grow uncontrolled, can reduce crop yields by 82% or even more (Naharia et al., 2018). The critical competition between rice plants and weeds begins when the rice plants are three to eight weeks after planting (DAP). Production will significantly reduce if weeds are not controlled during this critical period. Weed control is necessary for rice cultivation on newly cleared land and land planted for a long time.

Minahasa Regency is one of the rice production centres in North Sulawesi. Until now, studies or research that examine the dominant number value (DNV) of weed vegetation as a nuisance plant in rice cultivation have been very lacking. There is still a lack of research that examines the analysis of the Dominant Number Value of weed vegetation and weed competition with cultivated plants, especially rice fields. Research on rice crops is mainly limited to fertilization technology, pest control, and disease control. An in-depth study of weed population dynamics by analyzing the Dominant Number of weeds in rice cultivation on farmers' paddy fields in Minahasa Regency is still minimal. This study examines the value of the dominant Number of weed populations in rice field cultivation.

RESEARCH METHODS

This research was conducted in Koya Village, West Tondano District, Minahasa Regency, North Sulawesi Province, Indonesia, from June 2023 to October 2023. The tools used in this study were square size 0.5 m x 0.5 m, scales, knives, plastic bags, paper bags, labels, sprayers, measuring flasks, and ovens, while the materials used were IR-64 rice seeds and weeds growing in the research field.

The conduct of the study includes planting and observing weeds. Rice planting is carried out with a planting distance of 20 cm X 20 cm. Weed observation with Dominant Number Value analysis, using the square of a sample plot measuring 50 cm x 50 cm randomly placed on the experimental field. The Dominant Number Value Analysis was carried out four times, namely at the beginning of the study as an initial vegetation analysis, observing 21 days after planting (DAP), 45 days after planting (DAP), and 60 days after planting (DAP) by removing weeds contained in the sample plot or the square of the sample.

Weed sampling was good at the initial observation, observations of 21 DAP, 45 DAP and 60 DAP, each of which was carried out 9 times squared throws in the following ways: 1) Preparing a square with a

indonesian.biodivers.j.
Vol. 5, No. 1. April 2024
ISSN : 2722-2659

size of 0.5 m x 0.5 meters; 2) Sampling by throwing the square of the sample 9 times on each observation (initial observation, observation 21 DAP, observation 45 DAP and 60 DAP); 3) Remove all weeds found in the square of the sample, clean and separate weeds by type or species; 4) Calculate the Number of specific species present in the square of the sample; 5) Calculate the presence of particular weed species present at each square throw of the sample; 6) Drying weed species at a specific temperature by providing codes based on the species contained in the square of the sample both at initial observations, 21 DAP observations, 45 DAP observations, and 60 DAP observations; and 7) Calculate the dry weight of weed species based on observation time (initial observation, 21 DAP observation, 45 DAP and 60 DAP observation) on each square.

Observation Modifiers

The observation modifier uses the formula proposed by Tjitrosoedirdjo et al. (1984), which includes density, frequency, absolute dry weight, relative dry weight, and Dominant Number Value of the weed population. Absolute Density (AD) is the number of individuals of a particular weed species in the sample compartment. Absolute Frequency (AF) is a number of sample tiles containing a specific weed species.

$$\text{Relative Density (RD)} = \frac{\text{AD of a particular species}}{\text{Number of AD of all species}} \times 100\%$$

$$\text{Relative Frequency (RF)} = \frac{\text{AF specific species}}{\text{AF counts of all species}} \times 100\%$$

Dry Weight of Weeds

Determination of the dry weight of weeds is carried out by weighing the dry weight of weeds that have been dried in the oven at a temperature of 80° C for 3 x 24 hours. Weeds are grouped according to the same species. Absolute Dry Weight (ADW) is Dry weight of certain weed species.

$$\text{Relative Dry Weight (RDW)} = \frac{\text{ADW of certain species}}{\text{Number of ADW of all species}} \times 100\%$$

Based on the analysis results, the Dominant Number Value (DNV) can be determined.

Dominant Number Value (DNV)

$$\text{DNV} = \frac{\text{RD}+\text{RF}+\text{RDW}}{3}$$

RESULTS AND DISCUSSION

From the results of initial weed observations, 17 types of weeds were obtained, consisting of nine species of broadleaf weeds, namely *Marselia crenata, Ludwigia octovalvis, Limnocharis flava, Ipomea aquatica, Monochoria vaginalis, Ludwigia adcendens, Alternatera sesilis, Ludwigia angustifolia* and *Ludwigia hyssopifolia*. Narrow-leaved weeds or grass weeds, as many as four species, namely *Paspalum disticum, Echinochloa crusgalli, Leersia hexandra, Echinochloa colonum*, and four species of sedge weed are: *Fimbristilis litoralis, Cyperus iria, Scirpus juncoide* and *Cyperus difformis.* Table 1 shows that the five types of weeds with the highest density are *Paspalum disticum (271),* Marsilea crenata *(224), Fimbristilis litoralis* (138), *Cyperus iria (*73) and *Scirpus juncoides* (27).

The results in Table 1 show that two weed species have the highest absolute frequency with a value

indonesian.biodivers.j.
Vol. 5, No. 1. April 2024
ISSN : 2722-2659

of 9, namely *M. crenata* and *P disticum*. Followed by four weed species with a total density value of 7*: L. octovalvis, E. colonum, F. litoralis,* and *C. iria*. Weed species with an absolute frequency value of 6 are as many as three weed species, namely M. vaginalis, S. juncoides, and *C. iria.* In weed species with a frequency value of 5, there are two species, namely *E. crusgali* and *L. hexandra*. Other weed species with an absolute frequency value of less than five *are L. flava, Ipomea aquatica, L. adcendens, A. sessilis,* and *L. hyssopifolia*.

Table 1. Analysis of Dominant Number Value (DNV) of Initial Weed Observation

No	Species	AD	RD %	AF	RF %	ADW g	RDW %	DNV %
Broad Leaf								
1	*M. crenata*	224	26.60	9	10.47	23.12	9.24	15.44
2	*L. octovalvis*	20	2.38	7	8.14	21.24	8.49	6.34
3	*L. flava*	5	0.59	4	4.65	4.20	1.68	2.31
4	*I. Aquatics*	1	0.12	1	1.16	0.90	0.36	0.55
5	*M. vaginalis*	10	1.19	6	6.98	8.90	3.56	3.91
6	*L. Adscendens*	3	0.36	3	3.49	3.50	1.40	1.75
7	*A. sessilis*	3	0.36	2	2.33	1.00	0.40	1.03
8	*L. angustifolia*	1	0.12	1	1.16	0.89	0.36	0.55
9	*L. hyssopifolia*	1	0.12	1	1.16	1.23	0.49	0.59
Grass								
10	*P. disticum*	271	32.19	9	10.47	45.24	18.09	20.25
11	*E. crusgalli*	10	1.19	5	5.81	12.56	5.02	4.01
12	*L. hexandra*	16	1.90	5	5.81	5.60	2.24	3.32
13	*E. colonum*	21	2.49	7	8.14	17.30	6.92	5.85
Sedge								
14	*F. litoralis*	138	16.39	7	8.14	54.67	21.86	15.46
15	*C. would*	73	8.67	7	8.14	32.98	13.19	10.00
16	*S. juncoides*	27	3.21	6	6.98	9.98	3.99	4.72
17	*C. difformis*	18	2.14	6	6.98	6.80	2.72	3.94
		842	100.00	86	100.00	250.11	100.00	100.00

Description: AD = Absolute Density; RD = Relative Density; AF= Absolute Frequency; RF= Relative Frequency; ADW= Absolute Dry Weight; RDW= Relative Dry Weight; DNV= Dominant Number Value

From the results of DNV analysis of initial weed observations, five weed species with the highest Relative Density Value (RD) can be known, namely: *P. disticum* (32.19 %), *M. crenata* (26.60 %), *F. litoralis* (16.39 %), *C. Iria* (8.67 %) and *S. juncoides* (3.21 %). Other weed species with less than 3% RD are *C. diformis, E. colonum, L. hexandra, E. crusgalli, L. octovalvis, I. aquatica, M. vaginalis, L. adcendens, A. sessilis, L. angustifolia* and *L. hyssophifolia.*

The weed species with the highest Relative Frequency (RF) value are six weed species, namely *M. crenata* and *P. disticum* (10.47 %), *L. octovalvis, E. colonum, F. litoralis,* and *C. would* (8.14). Other weed

indonesian.biodivers.j.
Vol. 5, No. 1. April 2024
ISSN : 2722-2659

species with RF values less than 8% are *S. juncoides, C. difformis, E. crusgalli, L. hexandra, L. flava, I. aquatica, M. vaginalis, L. adcendens, A. sessilis, L. angustifolia dan L. hyssopifolia.*

Absolute Dry Weight Value (ADW) more than 20%, i.e., *F. litoralis* (54.67 %), *P. disticum* (45.24 %), *C. would* (32.98), *M. crenata* (23.12), and *L. octovalvis* (21.24 %). Other weed species with ADW values of less than 20% are *L. flava, I. aquatica, M. vaginalis, L. adcendens, A. sessilis, L. angustifolia, L. hyssopifolia, E. crusgalli, L. hexandra, E. colonum, S. juncoides,* and *C. difformis*. The Nisbih Dry Weight Value (RDW) shown in Table 1 has five weed pesies with the highest RDW value, namely: *F. litoralis* (21,86 %), *P. disticum (*18.09 %), *C. would* (13.19 %), *M. crenata* (9.24 %) and *L. octovalvis* (8.49 %).

There are five species of sugar with the highest DNV value being *P. disticum* (20,25 %), *F. litoralis* (15.46 %), *M. crenata* (15.44 %), *C. would* (10.00 %) and *L. octovalvis* (5.34 %). Other weed species with less than 6% DNV, *namely E. colonum* (5.85 5), *S. juncoides* (4.72 %), *E. crusgalli* (4.01 %), *C. difformis* (3.94 %), *M. vaginalis* (3,91 %), *L. hexandra* (3.32 %), *L. flava* (2.31 %), *L. adcendens* (1.75 %), *A. sessilis* (1.03 %), *L. hyssopifolia* (0.59 %), *L. angustifolia* (0.55 %) and *I. Aquatics* (0.55 %).

Weed observation 21 days after planting (DAP)

Table 2 shows that there are six species of weeds with AD values greater than 80, namely: *P. disticum* (184), *E. crusgalli* (114), *L. hexandra* (110), *F. litoralis* (98), *M. crenata* (82), and *E. colonum* (68). AF data shows that there are eleven weed species with AF 9, namely *M. crenata, L. flava, M. vaginalis, L. adscendens, L. angustifolia, P. disticum, E. crusgalli, L. hexandra, E. colonum, F. litoralis* and *C. would*. Two species of weeds with FM 8 are *L. octovalvis* and *S. juncoides*. There are one weed species with AF 7: C. difformis, one weed species with an AF value of 6 is L. hyssopifolia, and one with an AF value of 5, i.e. *Ipomea aquatica*.

There are five species of sugar with an RD value of more than 9%, namely *P. disticum* (20.82 %), *E. crusgalli (*12.62 %), *L. xehandra* (12.18 %), *F. litoralis* (10.85 %) and *M. crenata* (9.08 %). Other weed species with RD values range from 9.00% - 1.00% (Table 2).

Most weed species have RF values between 5.00% - 7.00%. There are weed species with less than 5% RF values, namely *I. aquatica* and *L. hyssopifolia.*

There are four weed species with RDW values of more than 10%, namely: *E. crusgalli* (23.45 %), *L. hexandra* (13.29 %), *P. disticum* (12.78 %), and *M. crenata* (11.25 %). The RDW value of other weeds is less than 10%, which ranges from 1.00% - 9.00% *that is L. octovalvis, L. flava, I. aquatica, M. vaginalis, L. adcendens*, *L. angustifolia, L. hyssopifolia, E. colonum, F. litporalis, C. iria dan S. juncoides.*

Table 2 shows that the five species with the highest DNV values were *P. disticum (17.26%), E. crusgalli (10.49%),* F. litoralis *(9.57%), Marsilea crenata* (9.27%) and *L. hexandra* (7.34%). Other weed species have DNV values ranging from 2% – 7%.

indonesian.biodivers.j.
Vol. 5, No. 1. April 2024
ISSN : 2722-2659

Table 2. DNV Analysis at 21 HST Observations

No	Species	AD	RD %	AF	RF %	ADW gr	RDW %	DNV %
Broad Leaf								
1	*M. crenata*	82	9.08	9	6.77	22.00	11.25	9.03
2	*L. octovalvis*	41	4.54	8	6.02	16.00	8.18	6.24
3	*L. flava*	32	3.54	9	6.77	6.54	3.34	4.55
4	*I. Aquatics*	6	0.66	5	3.76	3.40	1.74	2.05
5	*M. vaginalis*	37	4.10	9	6.77	7.98	4.08	4.98
6	*L. Adscendens*	17	1.88	9	6.77	3.10	1.58	3.41
7	*L. angustifolia*	18	1.99	9	6.77	4.32	2.21	3.66
8	*L. hyssopifolia*	9	1.00	6	4.51	4.32	2.21	2.57
Grass								
9	*P. disticum*	188	20.82	9	6.77	25.00	12.78	13.46
10	*E. crusgalli*	114	12.62	9	6.77	45.87	23.45	14.28
11	*L. hexandra*	110	12.18	9	6.77	25.99	13.29	10.75
12	*E. colonum*	68	7.53	9	6.77	4.56	2.33	5.54
Sedge								
13	*F. litoralis*	98	10.85	9	6.77	10.76	5.50	7.71
14	*C. would*	32	3.54	9	6.77	8.32	4.25	4.85
15	*S. juncoides*	24	2.66	8	6.02	4.70	2.40	3.69
16	*C. difformis*	27	2.99	7	5.26	2.75	1.41	3.22
		903	100.00	133	100.00	195.61	100.00	100.00

Description: AD = Absolute Density; RD = Relative Density; AF= Absolute Frequency; RF= Relative Frequency; ADW= Absolute Dry Weight; RDW= Relative Dry Weight; DNV= Dominant Number Value

Results of weed observation 45 days after planting (DAP)

Table 3 shows that of the ten weed species found in the 45 DAP observation, seven weed species have AD values between 17 – 45, and three weed species have AD values between 2 – 6. There are six species of weeds with AD values between 6 and 9 and four with FM values between 3 and 5.

There are seven species of weeds with RD between 8% - 23%, namely: *E. crusgalli* (22.96 %), *P. disticum (*19.90 *%), L. hexandra* (13.27 %), *C. would* (10.20 %), *C. difformis* (10.20 %), *L. adcendens* (8.67 %) and *F. litoralis* (8.67 %). Three other weed species are *M. vaginalis,* with an RD value of 3.06%, *L. flava,* with an RD value of 2.04%; and *L. octovalvis,* with a DNV value of 1.02 %.

Table 3 also shows that there are eight weed species with RF values ranging from 8% to 16%, namely *P. disticxum* (15.25 *%), F. litoralis* and *C. would* (11.86 *%), M. vaginalis* and *C. difformis* (10.17 %), *E. crusgalli* and *L. hexandra* (8.47 %). RF values of 2 other weed species are *L. flava* (6.78%) and *L. adcendens* (5.08 %). There are four species of weeds with high RDW, namely *F. litoralis* (54.67%), *P. disticum* (45.24 %), *C. would* (32.98%) and *L. octovalvis* (21.24 %).

The five dominant weed species with the highest DNV values are *P. disticum* (19.42 %), *F. litoralis* (16.16 %), *C. would* (12.97 %), *E. crusgalli* (12.62 %) and *L. hexandra* (8.20 %).

indonesian.biodivers.j.
Vol. 5, No. 1. April 2024
ISSN : 2722-2659

Table 3. DNV Analysis at 45 HST Observations

No	Species	AD	RD %	AF	RF %	ADW gr %	RDW	DNV %
Broad Leaf								
1	*L. octovalvis*	2	1.02	7	11.86	21.24	10.85	7.91
2	*L. flava*	4	2.04	4	6.78	4.20	2.15	3.66
3	*M. vaginalis*	6	3.06	6	10.17	8.90	4.55	5.93
4	*L. Adscendens*	17	8.67	3	5.08	3.50	1.79	5.18
Grass								
5	*P. disticum*	39	19.90	9	15.25	45.24	23.12	19.42
6	*E. crusgalli*	45	22.96	5	8.47	12.56	6.42	12.62
7	*L. hexandra*	26	13.27	5	8.47	5.60	2.86	8.20
Sedge								
8	*F. litoralis*	17	8.67	7	11.86	54.67	27.94	16.16
9	*C. would*	20	10.20	7	11.86	32.98	16.85	12.97
10	*C. difformis*	20	10.20	6	10.17	6.80	3.47	7.95
		196	100.00	59	100.00	195.69	100.00	100.00

Description: AD = Absolute Density; RD = Relative Density; AF= Absolute Frequency; RF= Relative Frequency; ADW= Absolute Dry Weight; RDW= Relative Dry Weight; DNV= Dominant Number Value

Weed Observation Results in 60 Days After Planting (DAP)

Table 4 shows that only eight species of weeds were growing in paddy fields at the time of 60 HST observations. The highest AD value is found in weed species *E. crusgalli* by 67, and the lowest AD value is found in weed species *M. vaginalis* with a value of 3. The highest AF values are found in weed species *S. juncoides* by seven, and the lowest AF value is found in weed species *M. vaginalis,* amounting to 3.

Table 4. DNV Analysis at 60 HST Observations

No	Species	AD	RD %	AF	RF %	ADW gr %	RDW	DNV %
Broad Leaf								
1	*L. octovalvis*	5	2.53	4	9.30	21.24	14.56	8.79
2	*L. flava*	6	3.03	5	11.63	4.20	2.88	5.85
3	*M. vaginalis*	3	1.52	3	6.98	8.90	6.10	4.86
Grass								
4	*P. disticum*	62	31.31	5	11.63	32.00	21.93	21.62
5	*E. crusgalli*	67	33.84	7	16.28	43.00	29.47	26.53
6	*L. hexandra*	16	8.08	6	13.95	5.60	3.84	8.62
Sedge								
7	*F. litoralis*	26	13.13	6	13.95	21.00	14.39	13.83
8	*S. juncoides*	13	6.57	7	16.28	9.98	6.84	9.89
		198	100.00	43	100.00	145.92	100.00	100.00

Description: AD = Absolute Density; RD = Relative Density; AF= Absolute Frequency; RF= Relative Frequency; ADW= Absolute Dry Weight; RDW= Relative Dry Weight; DNV= Dominant Number Value

indonesian.biodivers.j.
Vol. 5, No. 1. April 2024
ISSN : 2722-2659

Table 4 shows that the highest RD is found in weed species of narrow leaf or grass group, namely *E. crusgalli* by 33.84 %, *P. disticum* by 31.31%, and *L. hexandra* by 8.08%. RD in the weed species of the sedge group, namely *F. litoralis* 13.13 % and *S. juncoides* 6.57%. RD broadleaf weed type less than 4%.

There was a similarity in the RF value of weed species in observing 60 DAP, namely weed species *E. crusgali* and *S. juncoides* (16.28 %), *L. hexandra,* and *F. litoralis* (13.95 %). RDW, the highest weed species are found in leaf, narrow, or grass weeds, namely *E. crusgalli* at 29.47 % and *P. disticum* at 21.93%, followed by weed species *L. octovalvis* at 14.56 % and *F. litoralis* at 14.39%. The lowest RDW is found in weed species *L. flava,* by 2.88%.

Table 4 shows that the highest DNV is found in the narrow-leaf weed or grass group, namely *Echinochloa crusgalli* at 26.42 % and *Paspalum distichum* at 21.52%. The lowest DNV is located in the broadleaf weed group, *Monochoria vaginalis,* by 4.86%.

Discussion

From the results of initial weed observations, it can be seen that the dominant weed of the broadleaf group is *M. crenata* with a DNV of 15.44 %, of the narrow leaf or grass group is *P. disticum* with a DNV of 20.25%, and the tech-techs are *F. litoralis* with DNV at 15.46%. The high value of the dominant Number of species *M. crenata* with a DNV of 15.54% is because the weed species get adequate growing facilities. After all, there is no competition with cultivated plants, namely rice fields. With growing facilities such as increasing space, water, CO2, nutrients, and other growing facilities are still available sufficiently. These factors support weed seeds to require germination so that they can grow well (Alam et al., 2001)

Another species with high DNV is a type of weed from the narrow leaf or grass group, namely *P. disticum,* with a DNV of 20.25%. The weed is dominant because the weed will grow well in open conditions without shade. Thus, sunlight can be obtained optimally for the photosynthesis process. A characteristic of grassy plants is that they grow well on land without shade. Therefore *P. disticum* can thrive in rice fields. F. *litoralis* weeds usually grow in wet, muddy, and semi-wet places and are generally found in rice fields (Caton et al., 2010). According to (Miranda et al., 2011). the process of growing *F. miliacea* in clumps and tightly so that the chance of releasing allelopathy substances is higher than in other weeds. The quality and quantity of allelopathy compounds released by weeds are influenced by weed density, weed type, and weed growth speed.

The dominant species of the Sedge group is *S. juncoides,* with an DNV of 20.25%. *S. juncoides* is a plant with physical characteristics that are not tall. On observation land, most of the vegetation that grows before planting is not high, so that *S. juncoides* can compete for the means of increasing. In addition, sometimes, carrying out technical control does not guarantee that weeds that are uprooted/removed will die (Syaifudion *et al*., 2022).

Weeds that grew in the observation of 21 DAP as many as 16 species, the highest DNV was found in narrow-leaf weeds or grasses, *namely E. crusgalli, P. disticum,* and *L. hexanda.* The high DNV in narrow-leaf weeds or grasses may be caused because the nature of the three weeds is the same as rice

indonesian.biodivers.j.
Vol. 5, No. 1. April 2024
ISSN : 2722-2659

plants, which can grow well on land without shade. At the age of 21, DAP physically rice plants are not high so that the three weeds can still get good growing facilities such as CO2 and sunlight for photosynthesis, and water is still available to transport nutrients through the roots. At the age of 21 DAP, the growing space for the three weeds is still very available because there are not many rice saplings, so the available growing space allows the three weeds from the narrow leaf group or grasses to grow well. In the condition of rice, if it loses competition it will cause yield losses of up to approximately 90% (Naharia *et al.* 2018).

Weed species from the broadleaf group, such as *L. hyssopifolia* are not able to compete with narrowleaf weeds or grasses and rice crops because in the fight for growing facilities, more specifically the fight for sunlight, the two weed species are unable to compete. This is also because physically, the two weeds are not high, so they are covered by narrow leaf group weeds or grasses and rice field plants, so the two types of weeds do not have many populations. Some weeds often found in rice fields include M. *vaginalis,* M. crenata*, Paspalum* sp.*, E. colona*, and C. rotundus *(Umiyati, 2023).*

In observing weed populations at the age of rice plants 45 DAP, there were ten species of weeds. Compared with the Number of weed species at 21 DAP, six species of weeds do not grow. Weeds with the highest DNV are found in narrow-leaf weeds or grasses and weeds from the sedge group. Narrow-leaf weeds or grasses such as *P. disticum. E. crusgalli* and *Leersia is Hexagon.* Has a high DNV because both weeds have similar physical characteristics to rice field plants. In addition, it is also caused by the fact that both types of weeds can grow well on land without shade. Another cause is the possibility of investing the seeds of both weeds in the soil so much that both weed species can grow well under adequate environmental conditions. *F. litoralis* and *C. iria* are two species of weeds from the sedge group with high DNV. This is likely because both weed species effectively use light for the process of photosynthesis. Another possible cause is the ability of the two species to compete with cultivated plants to utilize growing facilities.

The decrease in the Number of weed species growing in rice fields when observed 45 DAP is more due to some weed species being unable to compete with cultivated plants, especially weed species with low physical forms; the canopy of rice field plants will block sugar species with low physical conditions so that these weed species cannot utilize sunlight optimally.

In observations, when rice plants were 60 DAP old, only eight species of weeds were growing. The dominant weed species comes from the grass group, *namely E. crusgalli.* This is because the weed species *E. crusgalli* is physically similar to rice field plants. The two plants are almost indistinguishable. This makes it very difficult for farmers to control. E. crusgalli weed species can be clearly distinguished when the age of rice plants is around 70 DAP, when fiscally when rice plants are 60 DAP, E. crusgalli weed species are higher than rice fields and form panicles containing blackish-brown seeds. P. *disticum* weed species with DNV values second only to *E. crusgalli* species. This is because, in addition to strong adaptability in growing space, these weeds can grow well in lava with sufficient water. Another weed species that has a high DNV is from the sedge group. This is likely due to the investment of weeds in the

indonesian.biodivers.j.
Vol. 5, No. 1. April 2024
ISSN : 2722-2659

soil, and many are also caused by the effectiveness of the use of sunlight and the ability to compete for growing space. F. *litoralis* weed species is a weed species that does not form many saplings, and these weed species tend to be able to survive in the cultivation of rice fields with many saplings and dense canopies. Weeds that have high importance in vegetative phase rice cultivation are *F. milaceae* (L) 58.26; *H. spinosa 39.57:*S. zeylanica *39.40* (Hoesain, 2019).

The place to determine the presence of weeds such as rice weeds in Paket Agung sub-district, Buleleng sub-district, which uses subak tegal, shows that there are 27 weed species classified into 13 families with a weed species diversity index of 1.0558 or categorized as medium diversity (Suryatini, 2018).

The nine species that did not grow in paddy fields when the plants were 60 DAP were likely due to extrinsic competition or weak competition with different plant species. The competition is for growing facilities such as sunlight, CO_2, water, growing space, and other growing facilities (Suryatini et al., 2018), causing a decrease in rice crop production of around 60%-87% (Syaifudin & Nofa, 2020)..

CONCLUSION

The weed species with the highest Dominant Number Value at initial observations in paddy fields were *P. disticum, F. litoralis, M. crenata, C. iria,* and *L. octovalvis*; The weed species with the highest Dominant Number Value at 21 DAP observations were *P. disticum, E. crusgalli, F. litoralis, M. crenata* and *L. hexandra*; The weed species with the highest Dominant Number Value at 45 DAP observations were *P. disticum, F. litoralis, C. iria, E. crusgalli,* and *L. hexandra*; The weed species with the highest Dominant Number Value at 60 DAP observations were *E. crusgalli, P. disticum, F. litoralis, S. juncoides,* and *S. juncoides.*

REFERENCES

Alam, S.M., Ala, S.A., Azmi, A.R., Khan, M.A., & Ansari, R. (2001). Allelopathy and its Role in Agriculture. In Communications in Soil Science and Plant Analysis. 11(1), 43–56. https://doi.org/10.1080/00103628009367014

Caton, B. P., Mortimer, M., Hill, J. E., & Johnson, D. E. (2010). A practical field guide to weeds of rice in Asia. *In International Rice Research Institute* https://doi.org/10.22004/ag.econ.164472

Hoesain, M, Hasjim, S, Widodo, N, Harsita, P.A. (2019). Analisis Nilai Penting Gulma Pada Tanaman Padi Dalam Rangka Pemilihan Pengendalian Ramah Lingkungan. *Agrimeta* 09(17), 14-17.

Kilkoda, A.K., T. Nurmala, & Widayat, D. (2015). Pengaruh keberadaan gulma (*Ageratum conyzoides* dan *Boreria alata*) Terhadap Pertumbuhan Dan Hasil Tiga Ukuran Varietas Kedelai (*Glycine max* L. Merr) Pada Percobaan Pot Bertingkat. *Jurnal Kultivasi* 14(2), 1-9.

Miranda, N., Suliansyah, I., & Chaniago, I. (2011). Eksplorasi dan Identifikasi Gulma Pada Padi Sawah Lokal (*Oryza sativa* L.) di Kota Padang. *Jerami* 4(1), 45–54.

Naharia, O. (2003). Kontribusi Olah Tanah Konservasi untuk Mitigasi Emisi Gas Metana pada Budidaya padi Sawah. *Jurnal Gulma Tropika* 1(2), 83-89.

Naharia, O., Setyanto, P., Arsyad, M., Burhan, H., & Aswad, M. (2018). The Effect of Water Regime and Soil Management on Methane (CH_4) Emission of RiceField. *IOP Conference Series: Earth and Environmental Science* 157 (1) 0120 12.

indonesian.biodivers.j.
Vol. 5, No. 1. April 2024
ISSN : 2722-2659

Palijama, W., Riry, J., & Wattimena, A.Y. (2012). Komunitas Gulma Pada Pertanaman hPala (*Myristica Fragrans* H) Belum Menghasilkan dan Menghasilkan di desa Hutumuri Kota Ambon. *Agrologia* 1 (2), 134-142.

Purnamasari, C.D., Tyasmoro, S.Y., & Sumarni, T. (2017). Pengaruh Teknik Pengendalian Gulma Pada Tanaman Padi (*Oryza sativa* L). *Jurnal Produksi Tanaman* 5(5): 870- 879.

Sari, W., & Azis, M. (2021). Analisis Vegetasi Gulma Padi Pandanwangi (*Oryza sativa* L. Aromatic) di Sentra Penanaman Padi Pandanwangi Kabupaten Cianjur. *Jurnal Pro-Stek* 3(1), 41-58.

Sari, H.F.M., & Rahayu, S.S.B. (2013). Jenis-jenis Gulma Yang Ditemukan di Perkebunan Karet (*Hevea brasiliensis* Roxb.) Desa Rimbo Datar Kabupaten 50 Kota Sumatera Barat. *Biogenesis* 1(1), 28-32.

Sembodo, D.R.J. (2010). Gulma dan Pengelolaannya. Yogyakarta: Graha Ilmu.

Solahudin, M., Seminar, K.B., Astika, I.W., & Buono, A. (2010). Pendeteksian Kerapatan dan Jenis Gulma Dengan Metode Bayes dan Analisis Dimensi Fraktal Untuk Pengendalian Gulma Secara Selektif. *Jurnal Keteknikan Pertanian* 24(2), 129-135.

Sukman, Y., & Yakup. (2002). Gulma dan Teknik Pengendaliannya. Depok: Raja Grafindo Persada.

Suryatini, L. (2018). Analisis Keragaman dan Komposisi Gulma Pada Tanaman Padi Sawah. *Jurnal Sains dan Teknologi* 7(1), 77-89.

Syaifudin, A., & Nofa, F.A. (2020). Jenis-Jenis Gulma Padi (*Oryza sativa* L) di Lahan Pertanian Desa Terban Kecamatan Warungasem Kabupaten Batang Provinsi Jawa Tengah. *Jurnal Biologica Samudra* 2(2), 128 – 136.

Syaifudion, E.A., Sofian, & Rizky, A.P. (2022). Identification of Weeds in Local Rice Swamp Fields in East Kalimantan in Rapak Lambur Village, Tenggarong District. *Jurnal Agroteknology Tropika Lembab* 5(1), 34-40.

Tampubolon, K., Sihombing, F.N, & Purba, Z., Samosir, S.T.S., & Karim, S. (2018). Potensi Metabolit Sekunder Gulma Sebagai Pestisida Nabati di Indonesia. *Jurnal Kultivasi* 17(3), 683-693.

Tjitrosoedirdjo, S., Utomo, I.H., & Wiroatmodjo, J. (1984). Pengelolaan Gulma di Perkebunan. Jakarta : PT Gramedia Pustaka Utama.