

Efficacy Test of *Cyperus rotundus* L., and *Ageratum conyzoides* L Bioherbicide for Weed Control and Their Effects on Baby Corn (*Zea mays* L.) Yield

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Abstract

Baby corn production in Indonesia continues to decline due to weed competition with corn plants. Weeds are the main competitors in the process of absorbing nutrients, water, light and space to grow. Weed control using synthetic herbicides can be reduced by using weed extracts as bioherbicides. This research aims to determine the effect of extracts from nutgrass (*Cyperus rotundus* L.), and whiteweed (*Ageratum conyzoides* L.) in controlling weeds and determining their effect on baby corn crop yields. The research has been carried out in fields on Brengosan, Sumberdadi, Mlati District, Sleman Regency, Special Region of Yogyakarta in March - May 2025. The research used a Randomized Complete Block Design with 7 treatments and 3 replications, namely without bioherbicides, 20% nutgrass extract, 40% nutgrass extract, 60% nutgrass extract, 20% whiteweed extract, 40% whiteweed extract, and 60% whiteweed extract. The resulting data were analyzed using 5% ANOVA and further tested using 5% LSD. The results showed that the treatment of 40% nutgrass extract had the highest weed control effectiveness, which was 77.97%.

Keywords: baby corn, bioherbicide, nutgrass, weed control, whiteweed

INTRODUCTION

Baby corn (*Zea mays* L.) is a corn plant that is harvested when the cobs are still young, specifically before pollination occurs and while the texture remains soft (Revilla et al., 2021). Baby corn is known for its tender texture and mild flavor (Prabowo, 2016). Weeds are major competitors in nutrient, water, light, and space absorption during crop growth. This competition can hinder plant development and lead to decreased corn production (Saputra et al., 2019). The presence of weeds in cultivated areas is inevitable, but it can be managed (Palijama et al., 2012).

Some farmers manage weeds using synthetic herbicides. The advantages of herbicide use include reduced labor demands, cost-effectiveness, and quick visible effects on unwanted plants. However, excessive application of herbicides can negatively impact the environment, cultivated crops, biodiversity, and lead to herbicide-resistant weeds (Sakiah et al., 2020). One alternative to reduce the negative impacts of herbicides is the use of natural herbicides. These offer several benefits, such as reduced weed resistance, environmental friendliness, accessibility of raw materials, ease of natural decomposition, and lower cost (Grecia et al., 2022).

Allelochemicals are secondary metabolites produced by plants that are not directly involved in growth processes. Plants utilize these chemicals to interact with their surrounding environment, through exudation from the roots or volatilization from other plant parts (Scognamiglio et al., 2013). The mechanism of action by which allelochemicals inhibit plant growth and development is complex. It typically begins with alterations in plasma membrane structure, modification of membrane channels, or disruption of ATPase enzyme function. These changes affect ion and water absorption, impacting stomatal opening and photosynthesis, ultimately leading to inhibited plant growth (Shofiyatin et al., 2020).

Allelochemicals are beneficial in agriculture due to their roles in weed management, growth regulation, and pest control. Their use can reduce dependency on synthetic chemicals. High concentrations of allelochemicals can suppress weed growth and repel pests (Faroog et al., 2009). Compared to synthetic herbicides, allelochemicals as bioherbicides offer several

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advantages: they are water-soluble and therefore easy to apply without surfactants, contain many oxygen- and nitrogen-based molecules, have minimal halogen content, and lack unnatural ring structures. Furthermore, their short half-life prevents soil accumulation and reduces impacts on non-target plants. Although more environmentally friendly, their rapid degradation may result in lower bioactivity compared to synthetic herbicides (Darmayanti, 2018).

Nutgrass contains allelopathic compounds. Its shoots are rich in phenolic acids, while the tubers contain hydroxybenzoate, ferulate, phanilate, caffeic, and chlorogenic acids. Phenolic compounds can be toxic to cultivated plants and reduce crop quality (Agustin et al., 2018). Whiteweed also possesses allelopathic activity, particularly in its stems and leaves. Compounds present in whiteweed include gallic acid, protocatechuic acid, benzoic acid, catechin, *p*-hydroxybenzoic acid, coumaric acid, *p*-coumaric acid, and sinapic acid (Rahayu et al., 2020).

Previous studies have demonstrated the potential of allelopathic plants such as nutgrass (*Cyperus rotundus* L.) and whiteweed (*Ageratum conyzoides* L.) in weed control. These plants contain bioactive compounds like phenolic acids and sesquiterpenes that inhibit weed growth (Agustin et al., 2018; Rahayu et al., 2020). However, most of this research has been limited to laboratory settings or focused on single-species applications. This leaves a gap in understanding their effectiveness in actual field conditions and their impact on specific crops like baby corn. Furthermore, optimal concentrations for effective weed suppression without harming crops remain unclear.

This study addresses these gaps by investigating the field efficacy of nutgrass and whiteweed extracts as bioherbicides in baby corn cultivation. The novelty of this research lies in its comprehensive evaluation of these extracts under real-world conditions, their impact on crop yield, and determination of the most effective concentrations for weed control. The objectives are to assess the weed-suppressing capabilities of these bioherbicides, identify their optimal application rates, and evaluate their effects on baby corn growth and yield. The findings aim to provide farmers with an eco-friendly, cost-effective alternative to synthetic herbicides—reducing environmental harm while enhancing agricultural productivity and sustainability. By bridging the gap between theoretical research and practical application, this study contributes to the advancement of sustainable farming practices.

METHOD

Research Location and Materials

The research was conducted from March 2025 to May 2025. The laboratory experiment took place at the Plant Protection Laboratory, Department of Agrotechnology, Faculty of Agriculture, Universitas Pembangunan Nasional “Veteran” Yogyakarta. The field experiment was carried out in Brengosan Hamlet, Sumberdadi, Mlati District, Sleman Regency, Special Region of Yogyakarta. The materials used included corn seeds (*Zea mays* L.), manure, NPK 16:16:16 fertilizer, 96% methanol, nutgrass (*Cyperus rotundus*) tubers, and whiteweed (*Ageratum conyzoides* L.) leaves.

Experimental Design and Bioherbicide Treatment

The research employed a Randomized Complete Block Design (RCBD) with seven treatments, including a control, each replicated three times. The treatments were as follows: A0: without bioherbicide; A1: 20% nutgrass extract; A2: 40% nutgrass extract; A3: 60% nutgrass extract; A4: 20% whiteweed extract; A5: 40% whiteweed extract; A6: 60% whiteweed extract.

Baby corn was planted at a spacing of 0.75 m × 0.3 m, with each treatment plot measuring 3.75 m × 1.5 m. Basal fertilization using goat manure was applied during tillage, while supplementary NPK fertilizer was administered at 12 DAP (Days After Planting), 28

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DAP, and 35 DAP. To manage *Spodoptera litura* (armyworm) infestations, Danke insecticide was applied at 25 DAP and again at 42 DAP. Fungicide treatment using Dimetomorf was applied at 15 DAP to prevent and control downy mildew. Bioherbicide applications were carried out at 2 WAP (Weeks After Planting) and 4 WAP.

Bioherbicide Preparation Process

Bioherbicide preparation followed the maceration method as outlined by Anggraeni et al. (2020) and Fatah et al. (2024). Nutgrass tubers and whiteweed leaves were collected and thoroughly washed with water to remove any adhering dirt or soil. The cleaned plant material was then chopped into small pieces and blended until finely crushed. The crushed plant matter was dried in an oven at 40°C for 72 hours. After drying, the material was placed in an extraction container and mixed with 96% methanol in a 1:10 ratio. The mixture was allowed to stand for 48 hours and stirred daily. Afterward, the mixture was filtered using filter cloth, and the filtrate was concentrated using a rotary evaporator at 40°C and 100 mBar pressure. The final extract was stored in tightly sealed, labeled bottles indicating the date of preparation and the plant material used. The bioherbicide was applied at 2 weeks after planting using a spray volume of 400 L/ha.

Vegetation Analysis

Weed vegetation analysis carried out before tillage and 3 WAP. Vegetation analysis using a ring sample measuring 0.5 m x 0.5 m. The formula used in vegetation analysis is (Nuraida et al. 2022):

Absolute Density : The number of individuals of a particular weed type in the sample plot

Relative Density : $\frac{\text{The absolute density of a particular type of weed}}{\text{Total absolute density of all types of weeds}} \times 100\%$

Absolute Dominance: Dry weight of a particular weed type from all sample plots

Relative Dominance : $\frac{\text{Absolute dominance of certain types of weeds}}{\text{Absolute dominance of all types of weeds}} \times 100\%$

Absolute Frequency : The number of sample plots that contain a certain type of weed

Relative Frequency : $\frac{\text{The absolute frequency of a particular type of weed}}{\text{Total absolute frequency of all types of weeds}} \times 100\%$

Summed Dominance Ratio (SDR) : $\frac{\text{Relative density} + \text{relative dominance} + \text{relative frequency}}{3}$

Similarity Index of Weeds

Similarity index are used to compare vegetation communities between blocks. The similarity index calculated after vegetation analysis before tillage. Similarity index of weed species using Sorensen index, with the following formula (Syarif et al. 2024):

$$S = \frac{2c}{a+b} \times 100\%$$

S = Similarity index

c = Same number of individuals in both locations

a = Number of all weed individuals in the first community

b = Number of all weed individuals in the second community

If the C value is $\geq 75\%$, it means that the two communities being compared are uniform.

Weed Control Efficacy

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Weed control efficiency is carried out to determine the effect of weed control. Observations were made after the treatment given, namely at 3 WAP. Weed control efficiency is calculated using the formula (Sebayang and Yudisthira, 2021):

$$WCE (\%) = \frac{DWC - DWT}{DWC} \times 100\%$$

W.C.E = Weed Control Efficiency (%)

DWC = Dry weight of control plot weeds

DWT = Dry weight of weeds in the treatment plot

Weed control efficiency categories are based on the Standard Method of Herbicide Efficacy Tests of Miranda *et al.*, (2021), as follows:

Table 1. Categories of weed control efficiency

Efficiency (%)	Description	Symbol
> 95,1%	Highly efficient	H
85,1 – 95 %	Efficient	E
50,1 – 85%	Moderately efficient	M
< 50%	Little efficient	L
0%	Not efficient	NE

Source: Miranda et al. (2021)

Data Analysis

Observation data were analyzed using ANOVA (Analysis of Variance) level of 5%, if the data obtained shows a real influence then further testing is done using the Least Significant Difference (LSD) with a level of 5%.

RESULTS AND DISCUSSION

Table 2. Weed Population Before Tillage

No	Weed Types and Species	Number of Weeds			Total
		Block 1	Block 2	Block 3	
Broadleaf					
1	Acalypha indica	-	-	2	2
2	Alternanthera philoxeroides	50	39	4	93
3	Alternanthera sessilis	1	1	1	3
4	Cleome rutidospora	2	2	6	10
5	Eclipta prostrata	5	-	1	6
6	Oldenlandia corymbosa	1	1	4	6
7	Parietaria judaica	1	1	9	11
8	Phyllanthus urinaria	-	1	16	17
9	Torenia crustaceae	15	4	-	19
10	Veronica agrestis	29	-	14	43
Grasses					
1	Cynodon dactylon	21	1	3	25
2	Echinochloa crus-galli	8	11	-	19
3	Eleusine indica	25	17	24	66
Sedges					
1	Cyperus brevifolius	46	118	142	306
2	Cyperus rotundus	32	21	51	104

Source: Primary data

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Table 3. Similarity Index values before tillage (%)

Similarity Index Comparison	Similarity Index (%)
Block I and Block II	88,00
Block II and Block III	80,00
Block I and Block III	84,62

Source: Data processed from vegetation analysis results

Table 4. SDR (Summed Dominance Ratio) Value Before Tillage (%)

No	Weed Types and Species	SDR (%)
Broadleaf		
1	<i>Acalypha indica</i>	2,40
2	<i>Alternanthera philoxeroides</i>	10,72
3	<i>Alternanthera sessilis</i>	2,50
4	<i>Cleome rutidospora</i>	3,14
5	<i>Eclipta prostrata</i>	2,77
6	<i>Oldenlandia corymbosa</i>	2,77
7	<i>Parietaria judaica</i>	3,23
8	<i>Phyllanthus urinaria</i>	3,77
9	<i>Torenia crustaceae</i>	3,96
10	<i>Veronica agrestis</i>	6,15
Grass		
1	<i>Cynodon dactylon</i>	4,51
2	<i>Echinochloa crus-galli</i>	3,96
3	<i>Eleusine indica</i>	8,25
Sedges		
1	<i>Cyperus brevifolius</i>	30,17
2	<i>Cyperus rotundus</i>	11,72
Total		100

Source: Primary data from vegetation analysis

Table 5. Weed Population 3 Weeks After Planting

No.	Weed Types and Species	A0	A1	A2	A3	A4	A5	A6	Total
Broadleaf									
1	<i>Acalypha indica</i>	-	-	-	-	1	-	-	1
2	<i>Alternanthera philoxeroides</i>	6	2	-	-	-	-	3	11
3	<i>Arabidopsis thaliana</i> (L.) Heynh	-	2	-	2	-	3	3	10
4	<i>Cleome rutidospora</i>	15	12	5	11	4	6	6	59
5	<i>Dentella repens</i>	3	-	-	-	-	-	-	3
6	<i>Euphorbia hita</i>	-	-	2	-	-	1	-	3
7	<i>Heliotropium indicum</i>	4	2	-	4	1	-	-	11
8	<i>Oldenlandia corymbosa</i>	5	-	-	1	-	2	2	10
9	<i>Origanum onites</i>	2	-	-	-	-	-	-	2
10	<i>Phyllanthus urinaria</i>	9	6	12	5	5	8	5	50
Grasses									
1	<i>Cynodon dactylon</i>	1	1	1	-	-	-	-	3
2	<i>Eleusine indica</i>	55	16	7	12	6	2	9	107
Sedges									
1	<i>Cyperus brevifolius</i>	38	-	-	-	3	-	1	42
2	<i>Cyperus rotundus</i>	85	64	45	53	37	44	69	397
Total		223	105	72	88	57	66	98	709

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Notes: WAP = Week After Planting, A0 (Control) = Without bioherbicide application, A1 = nutgrass (*Cyperus rotundus*) Extract 20%, A2 = nutgrass (*Cyperus rotundus*) Extract 40%, A3 nutgrass (*Cyperus rotundus*) Extract 60%, A4 = whiteweed (*Ageratum conyzoides* L.) Extract 20%, A5 = whiteweed (*Ageratum conyzoides* L.) Extract 40%, A6 = whiteweed (*Ageratum conyzoides* L.) Extract 60%.

Source: Primary data from field observation results

Table 6. SDR (Summed Dominance Ratio) value at 3 Weeks After Planting (%)

No	Weed Types and Species	Treatment						
		A0	A1	A2	A3	A4	A5	A6
Broadleaf								
1	<i>Acalypha indica</i>	-	-	-	-	5,93	-	-
2	<i>Alternanthera philoxeroides</i>	4,82	5,44	-	-	-	-	6,21
3	<i>Arabidopsis thaliana</i> (L.) Heynh	-	5,44	-	6,28	-	7,79	6,21
4	<i>Cleome rutidospora</i>	7,51	11,79	10,19	13,10	9,44	10,82	8,25
5	<i>Dentella repens</i>	3,93	-	-	-	-	-	-
6	<i>Euphorbia hita</i>	-	-	7,41	-	-	5,77	-
7	<i>Heliotropium indicum</i>	4,23	5,44	-	7,79	5,93	-	-
8	<i>Oldenlandia corymbosa</i>	4,52	-	-	5,52	-	6,78	5,53
9	<i>Origanum onites</i>	3,63	-	-	-	-	-	-
10	<i>Phyllanthus urinaria</i>	5,72	7,98	16,67	8,55	10,61	12,84	7,57
Grass								
1	<i>Cynodon dactylon</i>	3,33	4,80	6,48	-	-	-	-
2	<i>Eleusine indica</i>	19,47	14,33	12,04	13,85	11,78	6,78	10,29
Sedges								
1	<i>Cyperus brevifolius</i>	14,39	-	-	-	8,27	-	4,85
2	<i>Cyperus rotundus</i>	28,44	44,80	47,22	44,91	48,04	49,21	51,11
Total		100	100	100	100	100	100	100

Notes: WAP = Week After Planting, A0 (Control) = Without bioherbicide application, A1 = nutgrass (*Cyperus rotundus*) Extract 20%, A2 = nutgrass (*Cyperus rotundus*) Extract 40%, A3 nutgrass (*Cyperus rotundus*) Extract 60%, A4 = whiteweed (*Ageratum conyzoides* L.) Extract 20%, A5 = whiteweed (*Ageratum conyzoides* L.) Extract 40%, A6 = whiteweed (*Ageratum conyzoides* L.) Extract 60%.

Source: Data processed from field vegetation results

Table 7. Dry weight of weeds before tillage

No.	Weed Types and Species	Weed Dry Weight (g)
Broadleaf		
1	<i>Acalypha indica</i>	0,76
2	<i>Alternanthera philoxeroides</i>	84,55
3	<i>Alternanthera sessilis</i>	2,15
4	<i>Cleome rutidospora</i>	1,62
5	<i>Eclipta prostrata</i>	2,29
6	<i>Oldenlandia corymbosa</i>	0,43
7	<i>Parietaria judaica</i>	10,83
8	<i>Phyllanthus urinaria</i>	1,39
9	<i>Torenia crustaceae</i>	4,90
10	<i>Veronica agrestis</i>	11,42
Grasses		
1	<i>Cynodon dactylon</i>	50,83
2	<i>Echinochloa crus-galli</i>	25,33
3	<i>Eleusine indica</i>	93,47
Sedges		
1	<i>Cyperus brevifolius</i>	142,98

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2	<i>Cyperus rotundus</i>	124,64
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Source: Primary data from laboratory measurements

Table 8. Dry Weight of Weeds 3 Weeks After Planting

Treatment	Weed Dry Weight (g) 3 WAP	
Control (No bioherbicide application)	26,33	a
Nutgrass (<i>Cyperus rotundus</i>) Extract 20%	15,40	b
Nutgrass (<i>Cyperus rotundus</i>) Extract 40%	5,80	c
Nutgrass (<i>Cyperus rotundus</i>) Extract 60%	10,50	bc
Whiteweed (<i>Ageratum conyzoides</i> L.) Extract 20%	5,93	c
Whiteweed (<i>Ageratum conyzoides</i> L.) Extract 40%	6,53	c
Whiteweed (<i>Ageratum conyzoides</i> L.) Extract 60%	13,87	bc

Description: Numbers followed by the same letter in the same column show no significant difference in the LSD test at the 5% level. WAP= Weeks After Planting

Source: Primary data from ANOVA analysis

Table 9. Weed control efficacy

Treatment	Weed Control Efficacy (%) 3 WAP
Control (No bioherbicide application)	0,00 NE
Nutgrass (<i>Cyperus rotundus</i>) Extract 20%	41,51 L
Nutgrass (<i>Cyperus rotundus</i>) Extract 40%	77,97 M
Nutgrass (<i>Cyperus rotundus</i>) Extract 60%	60,12 M
Whiteweed (<i>Ageratum conyzoides</i> L.) Extract 20%	77,47 M
Whiteweed (<i>Ageratum conyzoides</i> L.) Extract 40%	75,19 M
Whiteweed (<i>Ageratum conyzoides</i> L.) Extract 60%	47,34 L

Notes: WAP = Weeks After Planting, NE = Not Efficient, L = Little Efficient, M= Moderately Efficient

Source: Data processed from field measurements

The results of vegetation analysis in this study were dominated by *Cyperus brevifolius* weeds before tillage (Table 2), with a dominance value of 30.17% (Table 4). At 3 weeks after planting, *Cyperus rotundus* species was the dominant weed in all treatment plots (Table 5), with the highest dominance value found in the whiteweed (*Ageratum conyzoides* L.) extract 60% treatment at 51.11% (Table 6).

Weed population data on weeds in block I, block II, and block III were grouped based on the type and species (Table 4) and then compared the similarity index between the three blocks. The similarity index value between block I and block II, block II and block III, and block I and block III (Table 5) have a similarity index value above 75%, indicating that the weed vegetation in blocks I, II, and III is homogeneous, so it can be used as weed research land.

The highest dry weight of weeds before tillage was found in *Cyperus brevifolius* species with a weight of 142,98 g (Table 7). Weed dry weight at 3 weeks after planting (Table 8) in the control treatment was significantly different from all other treatments having the highest weight valued at 26,33 g, while the lowest weight was found in the nutgrass (*Cyperus rotundus*) extract 40% treatment with a value of 5,8 g.

The efficacy of weed control in the treatment (Table 9) has effectiveness classified as moderately efficient in the treatment of nutgrass (*Cyperus rotundus*) extract 40%, nutgrass (*Cyperus rotundus*) extract 60%, whiteweed (*Ageratum conyzoides* L.) extract 20%, and

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 whiteweed (*Ageratum conyzoides* L.) extract 40%. In the treatment of nutgrass (*Cyperus rotundus*) extract 40% has the highest value, which is 77.97%.

Table 10. Average Height of Maize Plants

Treatment	Plant Height on the Age of (cm)					
	4 WAP		5 WAP		6 WAP	
Control (No bioherbicide application)	107,74	ab	167,41	a	209,17	b
Nutgrass (<i>Cyperus rotundus</i>) Extract 20%	98,50	b	169,93	a	214,20	ab
Nutgrass (<i>Cyperus rotundus</i>) Extract 40%	111,43	ab	183,17	a	231,50	a
Nutgrass (<i>Cyperus rotundus</i>) Extract 60%	114,30	a	180,64	a	226,25	ab
Whiteweed (<i>Ageratum conyzoides</i> L.) Extract 20%	113,88	a	185,80	a	224,10	ab
Whiteweed (<i>Ageratum conyzoides</i> L.) Extract 40%	106,68	ab	181,95	a	224,40	ab
Whiteweed (<i>Ageratum conyzoides</i> L.) Extract 60%	106,47	ab	174,53	a	219,17	ab

Description: Numbers followed by the same letter in the same column show no significant difference in the LSD test at the 5% level. WAP = Week After Planting

Source: Primary data from field measurements

Table 11. Average Fruit Weight per Plant

Treatment	Fruit Weight per Plant (g)
Control (No bioherbicide application)	151,85 b
Nutgrass (<i>Cyperus rotundus</i>) Extract 20%	162,96 a
Nutgrass (<i>Cyperus rotundus</i>) Extract 40%	166,93 a
Nutgrass (<i>Cyperus rotundus</i>) Extract 60%	170,52 a
Whiteweed (<i>Ageratum conyzoides</i> L.) Extract 20%	166,67 a
Whiteweed (<i>Ageratum conyzoides</i> L.) Extract 40%	170,37 a
Whiteweed (<i>Ageratum conyzoides</i> L.) Extract 60%	163,15 a

Description: Numbers followed by the same letter in the same column show no significant difference in the LSD test at the 5% level.

Source: Primary data on crop yields

Table 12. Dry weight of plant stems

Treatment	Stem Dry Weight (g)
Control (No bioherbicide application)	126,45 d
Nutgrass (<i>Cyperus rotundus</i>) Extract 20%	131,66 d
Nutgrass (<i>Cyperus rotundus</i>) Extract 40%	204,00 ab
Nutgrass (<i>Cyperus rotundus</i>) Extract 60%	226,50 a
Whiteweed (<i>Ageratum conyzoides</i> L.) Extract 20%	158,35 bcd
Whiteweed (<i>Ageratum conyzoides</i> L.) Extract 40%	198,52 abc
Whiteweed (<i>Ageratum conyzoides</i> L.) Extract 60%	140,77 cd

Description: Numbers followed by the same letter in the same column show no significant difference in the LSD test at the 5% level.

Source: Primary data from laboratory measurements

The results of baby corn plant growth can be seen in the increasing plant height (Table 10). In the 4th week observation, the treatment of nutgrass (*Cyperus rotundus*) extract 60% and whiteweed (*Ageratum conyzoides* L.) extract 20% had the highest value, in the 5th week there was no significant difference in all treatments. In the 6th week of observation, nutgrass (*Cyperus rotundus*) extract 40% treatment had the highest value, which was 231,5 cm and significantly different from the control treatment.

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Baby corn yields in all treatments were significantly higher than the control plot or without bioherbicide application (Table 11). Dry weight of plant stems (Table 12) treatment nutgrass (*Cyperus rotundus*) extract 40%, nutgrass (*Cyperus rotundus*) extract 60%, and whiteweed (*Ageratum conyzoides* L.) extract 40% were significantly heavier than the control plot and the treatment nutgrass (*Cyperus rotundus*) extract 20%.

Discussion

Observations on each parameter were made to determine the effect of the application of reed extracts, nutgrass extracts, and whiteweed extracts on weed control in corn plants. Based on the observation of vegetation analysis before tillage, showed that the dominant weed was the *Cyperus brevifolius* species with an SDR value of 30.17%. *Cyperus brevifolius* is classified as a sedge weed. Sedge weed is very adaptive and is a difficult weed to control. Nutgrass tubers that can reach a depth of one meter, so it is able to avoid the depth of tillage (30 cm). nutgrass can grow well when there is enough water available, tolerant of inundation, able to survive in drought conditions. Nutgrass is included in plants photosynthesizing through the C4 pathway (Hafsah *et al.* 2020).

The results of vegetation analysis at 3 changed between dominant weeds before tillage and dominant weeds at 3 WAP. Seeds and vegetative organs of these weeds are abundant in the soil from the previous season, and are brought up during tillage and germinate when they receive sufficient water and sunlight. These changes are thought to be influenced by weed control methods. The use of bioherbicides to control weeds affects changes in dominance and weed populations, where some weed species are affected while others are not (Setiawan *et al.* 2022).

The results of the research on the parameters of plant height, baby corn fruit weight, and dry weight of plant stems showed that the application of the treatment had a significant effect compared to no application of bioherbicides plot. Weeds compete with cultivated plants in absorbing nutrients, water, light and growing space. The appearance of weeds in the growth of cultivated plants can cause a decrease in the quantity of yield while at the end of growth the presence of weeds will result in a decrease in harvest quality (Ginting and Moenandir, 2020).

The treatment of nutgrass (*Cyperus rotundus*) extract 40% has the highest weed control efficacy value, in line with the effect on plant height has the highest value and produces fruit weight, and plant dry weight is significantly different from the control, this is due to the content of phenolic group compounds and sesquiterpene group compounds, namely α -cyperone and nootkatone compounds contained in teki tubers and can be used as weed control (Ridwan *et al.* 2022).

CONCLUSION

This research demonstrated that bioherbicides derived from *Cyperus rotundus* L. (nutgrass) and *Ageratum conyzoides* L. (whiteweed) extracts are effective for weed control in baby corn cultivation. Among the tested concentrations, the 40% *C. rotundus* extract showed the highest weed control efficacy (77.97%), significantly reducing weed biomass while enhancing crop growth parameters such as plant height (231.5 cm at 6 WAP), fruit weight (166.93 g/plant), and stem dry weight (204.00 g). The persistence of *Cyperus rotundus* as the dominant weed after treatment underlines the necessity for more targeted bioherbicide strategies. These findings support the adoption of plant-based herbicides as a sustainable alternative to synthetic chemicals, in line with environmental conservation and improved agricultural productivity objectives.

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