

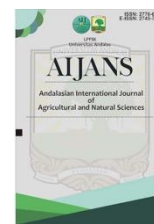


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Article

Identification of Weeds on Tea Planting (*Camellia Sinensis* L.) in Liki Farm Unit, PT. Mitra Kerinci, South Solok Regency

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Article Information	Abstract
Received : 2023-04-26 Revised : 2023-05-10 Accepted : 2023-05-25 Published: 2023-06-03	One of the plantation products that is a mainstay export commodity and is considered quite strategic in supporting the Indonesian economy is tea. However, in recent years tea production has fluctuated, to keep Indonesia as the world's main tea producer, production problems and intensive efforts that support productivity need to be managed optimally. Tea quality is strongly influenced by environmental factors such as the presence of weeds. Assessment of the types of weeds in tea plants can be done by identification based on morphology. The purpose of this study was to identify weeds in tea plants (<i>Camellia sinensis</i> L.) in the Liki plantation unit at PT. Mitra Kerinci. This activity was carried out in July - August 2022 at PT. Mitra Kerinci, Sungai Lambai, Nagari Lubuk Gadang Selatan, Sangir District, South Solok Regency, West Sumatra Province. Observations were made using descriptive methods. It was concluded that there were 8 families and 14 species of <i>broad-leaf</i> weeds; 1 family and 2 species of <i>Cyperaceae</i> weeds; 1 family and 3 species of <i>Poaceae</i> weeds; and 3 families and 4 species of <i>Filicinae</i> weeds in this tea plantation.
Keywords	
Identification, tea, weeds.	
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INTRODUCTION

International trade is one of the main factors to increase economic growth and development in a country, including export and import activities [1]. Indonesia is a country with abundant natural resources. Indonesia is known as a country that has a tropical climate so it is very suitable for planting various types of cultivated plants. This makes Indonesia have great potential to produce these resources into superior commodities to be traded to other countries through export activities so as to increase economic growth in Indonesia. The agricultural and plantation business sector is a good potential and provides an important role for the economy. In addition, according to data from the Central Bureau of Statistics, the agriculture and plantation sector also made a significant contribution to Gross Domestic Product worth 12.72% in 2019. One of the agricultural and plantation commodities that is a mainstay export commodity and is considered quite strategic in supporting the Indonesian economy is tea [2].

Tea plants are one of the leading commodities of plantation crops in Indonesia that are useful as beverages, medicines, and raw materials for making cosmetics. In recent years, tea production has fluctuated in Indonesia. Tea production in Indonesia had increased by 14.78% to 140.6 thousand tons in 2017. However, tea production in the country has

decreased again in 2018 to 2020 [3]. To keep Indonesia as the world's leading tea producer, tea production problems and intensive efforts that support productivity need to be managed optimally.

Tea quality is strongly influenced by environmental factors such as the presence of weeds. In tea cultivation activities, weeds are one of the main problems that can interfere with plant growth and production, because there will be competition between the main plants and weeds in terms of absorption of nutrients, minerals, water, and sunlight. Uncontrolled weed population growth can suppress the growth of tea plants and can extend the non-productive period for more than two years [4]. Weeds that grow alongside cultivated plants can reduce yields, both in quality and quantity. Weeds are undesirable because they compete with cultivated plants and require considerable control costs, which are around 25% - 30% of production costs [5].

Buhler *et al.* [6] mentioned that there are several ways to identify weeds that are taken. Identification can use one or a combination of various or ways such as; comparing the weed with material that has been identified, searching for yourself through identification keys, comparing it with existing determinations, comparing it with available illustrations, or direct consultation with experts in the field concerned. Assessment of the types of weeds in tea plants can be done by identification based on the morphology of the weeds themselves in order to be able to know how to control them. Therefore, researchers are interested in conducting research entitled Weed Identification in Tea Plantations (*Camellia sinensis* L.) in the Liki Plantation Unit, PT. Mitra Kerinci, South Solok Regency.

EXPERIMENTAL SECTION

This research was conducted from July to August 2022 at PT. Mitra Kerinci, Sungai Lambai, Nagari Lubuk Gadang Selatan, Sangir District, South Solok Regency, West Sumatra Province. The tools used in this activity are meters, cameras, 50 cm x 50 cm squares (frames), raffia ropes, wood as stakes, and stationery. While the material used, namely weeds in tea plants. Observations were made using descriptive methods. Weed sampling was carried out with 5 replicates with random plotting based on whether or not there were many weeds at that point. Samples were taken in the area of tea plants that have entered pruning year three (tp 3). In one replication, there were three observation plots measuring 5m x 5m. Frames with a size of 50 cm x 50 cm were thrown on a sample plot of 5m x 5m at each observation location. In one observation plot, two throws were made, namely the throw on the tea plants and also the throw on the barrow. Weeds found in the frame were visually observed and documented. The weed species found were identified based on their morphological characteristics. According to Djafaruddin [7] the classification of weeds based on morphology is divided into four namely: *Poaceae*, *Cyperaceae*, *Broad leaf* and *Filicinae*.

RESULT AND DISCUSSION

Based on observations that have been made, we found weeds from the *Cyperaceae* group, *Poaceae*, *Filicinae*, and *broadleaves* at the research site. The composition of weeds can be seen in Table 1 that *broad leaves* weeds were found as many as 8 families, and 14 species. *Cyperaceae* weeds consisted of 1 family and 2 species. *Poaceae* weeds consist of 1 family and 3 species. Meanwhile, *Filicinae* weeds consist of 3 families and 4 species. Based on observations at each location, the diversity of weed species found can be influenced by several

factors such as light, moisture, and soil fertility [8].

Table 1. Weeds in Five Observation Sites of Tea Plantation in Liki Plantation Unit, PT. Mitra Kerinci, South Solok Regency

No	Species	Familiy	Classification of Weeds
1.	<i>Schismatoglottis calyptrate</i> (Roxb.) Zoll & Mor.	<i>Araceae</i>	<i>Broad leaf</i>
2.	<i>Asplenium nidus</i> L.	<i>Aspleniaceae</i>	<i>Filicinae</i>
3.	<i>Ageratum</i>	<i>Asteraceae</i>	<i>Broad leaf</i>
4.	<i>Bidens pilosa</i> L.	<i>Asteraceae</i>	<i>Broad leaf</i>
5.	<i>Mikania micrantha</i> Kunth.	<i>Asteraceae</i>	<i>Broad leaf</i>
6.	<i>Crassocephalum crepidioides</i> (Benth.) S. Moore	<i>Asteraceae</i>	<i>Broad leaf</i>
7.	<i>Cyperus esculentus</i> L.	<i>Cyperaceae</i>	<i>Cyperaceae</i>
8.	<i>Cyperus kyllingia</i> L.	<i>Cyperaceae</i>	<i>Cyperaceae</i>
9.	<i>Commelina nudiflora</i> L.	<i>Commelinaceae</i>	<i>Broad leaf</i>
10.	<i>Isotoma longifera</i> (L.) Presl.	<i>Campanulaceae</i>	<i>Broad leaf</i>
11.	<i>Albizia julibrissin</i>	<i>Fabaceae</i>	<i>Broad leaf</i>
12.	<i>Mimosa pigra</i> L.	<i>Fabaceae</i>	<i>Broad leaf</i>
13.	<i>Clidemia hirta</i>	<i>Melastomataceae</i>	<i>Broad leaf</i>
14.	<i>Melastoma malabathricum</i> L.	<i>Melastomataceae</i>	<i>Broad leaf</i>
15.	<i>Peperomia pellucida</i> L. Kunth.	<i>Piperaceae</i>	<i>Broad leaf</i>
16.	<i>Piper betle</i> L.	<i>Piperaceae</i>	<i>Broad leaf</i>
17.	<i>Axonopus compressus</i> (SW.) P. Beauv	<i>Poaceae</i>	<i>Poaceae</i>
18.	<i>Setaria plicata</i> (Lam.) T. Cooke	<i>Poaceae</i>	<i>Poaceae</i>
19.	<i>Ottlochloa nodosa</i> Kunth	<i>Poaceae</i>	<i>Poaceae</i>
20.	<i>Polypodium vulgare</i> L.	<i>Polypodiaceae</i>	<i>Filicinae</i>
21.	<i>Drymoglossum piloselloides</i> (L.) Presl.	<i>Polypodiaceae</i>	<i>Filicinae</i>
22.	<i>Spermacoce ocymifolia</i> Wild.	<i>Rubiaceae</i>	<i>Broad leaf</i>
23.	<i>Dryopteris carthusiana</i>	<i>Thelypteridaceae</i>	<i>Filicinae</i>

At observation location 4, 5 types of broadleaf weeds were found, the most common species was *Ageratum conyzoides* L. The weeds of the teki-tekian group were only found in 1 species, namely *Cyperus esculentus* L. Then for the grass group weeds found as many as 3 species, namely *Axonopus compressus* and *Setaria plicata* (Lam.) T.Cooke. and *Ottlochloa nodosa* Kunth. While the weeds of the ferns group were found as many as 2 species and the most common was *Dryopteris carthusiana* (Vill) H.P. Fuchs. At observation location 5, broadleaf weeds were found as many as 3 species, *Spermacoce hispida* L. is the type of broadleaf weed most commonly found in the observation plot of afdeling E. The weeds of the teki- tekian group were only found in 1 species, namely *Cyperus esculentus* L. Then, the weeds of the grass group were found as many as 2 species, and the most commonly found, namely *Axonopus compressus* (SW.) P.Beauv. Likewise, the weeds of the fern group only found 1 species, namely *Dryopteris carthusiana* (Vill) H.P. Fuchs.

1. *Schismatoglottis calyptrate* (Roxb.) Zoll & Mor.

This weed is a weed that morphologically includes broadleaf weeds, and belongs to the *Araceae* or caladium family [9]. *Schismatoglottis calyptrate* (Roxb.) Zoll & Mor. tends to live in the shade of tea plants. However, this weed was only slightly found in the observation plots due to environmental factors of tea plantations that are not suitable for its

habitat. This weed usually lives in swamps or places with clay soil conditions [10]. The weed *Schismatoglottis calyptrate* (Roxb.) Zoll & Mor. can be seen in Figure 1.



Fig 1. *Schismatoglottis calyptrate* (Roxb.) Zoll & Mor.

2. *Asplenium nidus* L.

Asplenium nidus L. commonly referred to as bird's nest spikes belongs to the *Aspleniaceae* family. Morphologically, *Asplenium nidus* L. is classified as a fern-cognac weed. This weed lives epiphytically on tea plant stems. In its life, this species likes a slightly humid, shaded or slightly shaded place and does not like direct sunlight. Vertically, this type of fern is found growing at a height between 0.4 - 20 meters from the ground on its host, and is most commonly found at a height of 0.1 - 4.9 meters [11].



Fig 2. *Asplenium nidus* L. pada tanaman teh

3. *Ageratum conyzoides* L.

Ageratum conyzoides L. or commonly known as babadotan belongs to the *Asteraceae* family, and morphologically belongs to broadleaf weeds. This weed is the dominant weed found in each observation plot because of its high breeding ability, according to Anistia et al. [12] this weed can produce 40,000 seeds per individual plant, and is very adaptive to various environmental conditions. The weeds of *Ageratum conyzoides* L. are presented in Figure 3.



Fig 3. *Ageratum conyzoides* L. pada perkebunan teh

4. *Bidens Pilosa* L.

Bidens pilosa L. or commonly called ketul plant belongs to the *Asteraceae* family. Morphologically, ketul plants are included in broadleaf weeds that usually live in disturbed

areas, Bartolome et al. [13] stated that this weed usually grows among bushes, plantation areas, roadsides or vacant land that is not maintained.

5. *Mikania micrantha* Kunth.

Sambung rambat (*Mikania micrantha* Kunth.) belongs to the Asteraceae family and is a broadleaf weed. *Mikania micrantha* Kunth. grows creeper with growth can reach 3-6 meters. This weed lives in a creeping manner and can be wrapped around the stems of tea plants, the presence of this weed in the plantation is quite dominant because of its habitat which tends to be found in shrubs or plants with dense growth. Including invasive weeds that are difficult to control, grow vines covering their hosts and compete for soil nutrients, sunlight and water, often found in plantation and agricultural lands such as oil palm, tea, coffee, citrus and rubber [14] & [15].



Fig 4. *Mikania micrantha* Kunth.

6. *Crassocephalum crepidioides* (Benth.) S. Moore

Crassocephalum crepidioides (Benth.) S. Moore. or commonly known as sintrong belongs to the Asteraceae family. Morphologically, *Crassocephalum crepidioides* (Benth.) S. Moore. is included in broadleaf weeds. This weed has rapid growth, and can even outgrow tea plants. This weed has resistance to herbicide use, Sianturi *et al.* [16] mentioned that the screening results of 30 sintrong populations, as many as 19 populations (63.33%) were in the paracuat resistant category, with mortality of 10.84% - 52.08%, while 11 populations (36.7%) were in the highly resistant category, with mortality of 0% - 9.21%.



Fig 5. *Crassocephalum crepidioides* (Benth.) S. Moore

7. *Cyperus esculentus* L.

Morphologically, *Cyperus esculentus* L. is a weed of the Cyperaceae family. Based on observations, *Cyperus esculentus* L. was found in every observation plot, this is due to the climate of the tea plantation which is in accordance with its growth requirements, namely in the highlands and wet or humid areas. The dominance that occurs is because this weed is able to survive strongly even though it has been controlled using mechanical control because this weed has a stem tuber that can last for months [17].



Fig 6. *Cyperus esculentus* L.

8. *Cyperus kyllingia* L.

Cyperus kyllingia L. known by another name teki badot melaran belongs to the Cyperaceae family. Morphologically, *Cyperus kyllingia* L. belongs to the teki-tekian weed. This weed population is quite dominant because it can grow in open or somewhat sheltered places up to an altitude of 1,300 meters above sea level. In addition, this weed is an annual weed and has tubers so it is one of the weeds that is difficult to control. It is known from the research results of Efrianti *et al.* [18] that *Cyperus kyllingia* is able to grow on soil polluted with petroleum waste, the plant's response in the face of stress can be seen in vegetative growth in the form of growth in the number of shoots, stem height and leaf length. *Cyperus kyllingia* plants have a good ability to degrade Total Petroleum Hydrocarbon (TPH) with a percentage of 0.32-0.39%.



Fig 7. *Cyperus kyllingia* L.

9. *Commelina nudiflora* L.

Commelina nudiflora L. or commonly known as aur-aur is a weed of the Commelinaceae family which is classified as a broadleaf weed. This plant is mostly found in places with wet conditions so that the climate of tea plantations is suitable for the growth and development of this weed. In addition, aur-aur predominantly lives in the shade of tea due to moist conditions.



Fig 8. *Commelina nudiflora* L.

10. *Isotoma longifera* (L.) Presl.

Kitolod (*Isotoma longifera* (L.) Presl.) is a plant that belongs to the Campanulaceae family, and is a broadleaf weed. *Isotoma longifera* (L.) Presl. Usually lives in bush habitats, streams, and areas that have sufficient moisture.



Fig 9. *Isotoma longifera* (L.) Presl.

11. *Albizia julibrissin*

Albizia julibrissin is known by various names, such as Persian silk tree, plants in the Fabaceae family, and is classified as a broadleaf weed. *Albizia julibrissin* can grow up to 6-9 m and its leaves are up to 50 cm long, compound with 10-35 pairs of leaflets [19].



Fig 10. *Albizia julibrissin*

12. *Mimosa pigra* L.

Mimosa pigra L. or commonly known as giant puti malu belongs to the Fabaceae family and is a broadleaf weed. *Mimosa pigra* L. can grow in a tropical climate with an altitude of 1 - 1200 meters above sea level, Septiani *et al.* [20] identified that this plant is able to grow up to 200 cm.



Fig 11. *Mimosa pigra* L

13. *Clidemia hirta*

Clidemia hirta or commonly referred to as senduduk bulu is a plant that belongs to

the Melastomataceae family. Morphologically, *Clidemia hirta* belongs to a group of broadleaf weeds that have upright woody stems called shrubs. Plants live in habitats that get enough direct sunlight such as tea plantations. Santosa *et al.* [21] mentioned that *Clidemia hirta* weeds can be found in tea plantations at the age of 16 months after pruning and 40 months after pruning with an abundance found in 2 areas.



Fig 12. *Clidemia hirta*

14. *Melastoma malabathricum* L.

Melastoma malabathricum L. (senduduk) belongs to the Melastomataceae family and is a broadleaf weed. Morphologically, *Melastoma malabathricum* L. is a type of shrub with woody stems.



Fig 13. *Melastoma malabathricum* L.

15. *Peperomia pellucida* L. Kunth.

Peperomia pellucida L. Kunth. or commonly known as tumpang air plant belongs to the Piperaceae family. This weed is very easy to grow in tea plantations because of its habitat in shady and humid places, and can produce many seeds. According to Nurjani [22] *Peperomia pellucida* L. includes small terna plants that have a height of up to 45 cm. The round stem is pale green in color rather clear. Single leaves, thick but soft and crossed, ovate in shape with a pointed tip, heart-shaped base, and light green lower edge. Compound flowers are 1-5 cm long and green in color, located at the end of the stalk or at the base of the leaves. Small round fruits are green in color.



Fig 14. *Peperomia pellucida* L. Kunth.

16. *Piper betle* L.

Piper betle L. is a plant that belongs to the Piperaceae family and is classified as a broadleaf weed. This weed grows in the shade of plants, but its population is not found in tea plantations. Palijama *et al.* [23] added that *P. betle* weed is better able to adapt to shaded conditions with high soil moisture levels, besides that this plant is a C4 plant that cannot withstand high light intensity.



Fig 15. *Piper betle* L.

17. *Axonopus compressus* (SW.) P.Beauv.

Axonopus compressus (SW.) P.Beauv. (carpet grass) belongs to the Poaceae family and is included in grass weeds (narrow-leaved). This grass can grow at an altitude of 0-3000 meters above sea level.



Fig 16. *Axonopus compressus* (SW.) P.Beauv.

18. *Setaria plicata* (Lam.) T. Cooke.

Setaria plicata (Lam.) T.Cooke. is a type of weed that belongs to grass weeds and belongs to the Poaceae family. This weed is commonly found in the shade of tea plants. Simangungsong *et al.* [24] mentioned that *Setaria plicata* weed is an annual grass weed that usually lives in shady areas, this weed is an important weed in tea plantations because it is quite detrimental.



Fig 17. *Setaria plicata* (Lam.) T.Cooke

19. *Ottochloa nodosa* Kunth.

Ottochloa nodosa Kunth. (rumput sarang buaya) belongs to the Poaceae family and is

a grass weed. This weed is one type of weed that is difficult to control because of its rapid growth and stems that spread over the soil surface, and its population is quite dominant in tea plantations.

20. *Polypodium vulgare* L.

Polypodium vulgare L. belongs to the Polypodiaceae family which has green leaves and is epiphytic on tree trunks or rocks. Morphologically, *Polypodium vulgare* L. belongs to the class of fern weeds (Pteridophyta). This plant is a weed that usually lives in the shade with a growth of 20 to 40 cm. *Polypodium vulgare* L. has single type leaves with pinnate tips and flat edges. In addition, at the end of the leaf there is a sorus with an elongated shape and blackish brown color [25].



Fig 18. *Polypodium vulgare* L.

21. *Drymoglossum piloselloides* (L.) Presl.

Drymoglossum piloselloides (L.) Presl. or commonly known as *sisik naga* and belongs to the Polypodiaceae family and is a type of fern weed. The roots are attached to stems that are superimposed with leaves shaped like dragon scales. *Drymoglossum piloselloides* (L.) Presl. is a weed that can harm the main stem it is attached to. Dragon scales can be controlled by the moss scrubbing method, which involves scrubbing the host stem using a tool specifically designed for moss scrubbing.



Fig 19. *Drymoglossum piloselloides* (L.) Presl.

22. *Spermacoce ocymifolia* Willd.

Spermacoce ocymifolia Willd. is a plant that belongs to the Rubiaceae family. Morphologically, *Spermacoce ocymifolia* Willd. includes broadleaf weeds. This weed has lance-shaped leaves and rough texture, and has small white flowers. *Spermacoce ocymifolia* Willd. is a herbaceous or creeping plant.



Fig 20. *Spermacoce ocymifolia* Willd.

23. *Dryopteris carthusiana* (Vill) H.P. Fuchs

Dryopteris carthusiana (Vill) H.P. Fuchs. belongs to the Thelypteridaceae family. Morphologically, this weed belongs to the fern-raw weed group. The population of this weed is quite a lot in tea plantations because of the humid conditions that suit its habitat. In addition, this weed is difficult to control because it has rhizomes in the soil. Yunita *et al.* [26] mentioned that *Dryopteris* has a fibrous root form. Long upright rhizome stems, hairy brown surface and unbranched. Compound leaves are green, the position of the leaflets is alternating, the leaves are wavy with a downy surface, the leaf edges are serrated and the leaf tips are tapered. Sorus is located on the underside of the golden yellow leaf surface. This type of pteridophyta is found terrestrial under trees on moist soil surfaces.

CONCLUSION

It was concluded that the results of weed identification in tea plantations in the Liki plantation unit, PT Mitra Kerinci, South Solok found 4 classes of weeds, including *broad leaves* weeds as many as 8 families, and 14 species; *Cyperaceae* weeds consist of 1 family and 2 species; *Poaceae* weeds consist of 1 family, and 3 species; and *Filicinae* weeds consist of 3 families, and 4 species.

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