Weed vegetation analysis in Universitas Perjuangan of Tasikmalaya

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Abstract. Weed is the plants which have some negative effect to the cultivated plant. They are undesirable plants that must be control by farmer or everyone who want to keep their area from weed. There are several methods to control them, it means preventive method, responsive method, and makes the weeds as beneficial plants. The aim of this research was to study the weed vegetation in the area of Universitas Perjuangan of Tasikmalaya. The summed Dominance Ration (SDR) value was measured to know the each species dominance from 20 sample plots. The result showed there are seven species identified from Asteraceae, and a species from Fabaceae family. *Sphagneticola trilobata* and *Tridax procumbens* were major species those growth with the SDR values at 0.529, and 0.151 respectively.

1. Introduction
Weed is the wild plant growing where they are not wanted by people [1]. In the field, they make a competition with the cultivated plant to make use of nutrients, water, light, and the area. Weed is one of the limiting factor that affecting the growth and yield of cultivated plants. They have better characteristic such as growth ability that faster than cultivated plant. They flower earlier, run to seed in profusion and mature ahead of the cultivated plant. Other weed characteristics is the ability to survive under adverse conditions, they have a very high reproductive capacity. If there are not efforts to control them, they will become harmful.

There are several methods to control the weeds. The first is preventive control method that objectives to prevent weeds from being established in cultivated plant area. It could be using certified weed free seed, making sure that farm equipment is cleaned before use or moving from one location to another, and screening irrigation water to prevent weed seeds from traveling along irrigation ditches. The second is responsive control method that objectives to reduce the weeds population. It could be by mechanical methods that use the farm equipment to tillage or mow. By biological methods that involve the natural enemies of weeds such as sheep, goats, cow, or another livestock animal that consumes the weeds [2]. Not only using the control methods above, we can also manage the weeds with another approach. Some weeds have a potential to use as beneficial plant, like as raw material to make green manure, botanical pesticides, or we can use some flowering weeds as an ornamental plant in the garden.
Vegetation analysis is used to determine weeds that have a high ability to growing dominate a living space. The dominance generally determines whether weeds are important or not. The dominant weed population can later be used as a consideration to make some weed control decisions. The aims of this research ware to analyze the weed vegetation in Universitas Perjuangan of Tasikmalaya and found the species which dominate.

2. Methods
The research was conducted at Universitas Perjuangan of Tasikmalaya, West Java, Indonesia during April to July 2018. The equipment were used to this research were stationery, rope, tally sheet to measure the weeds population. The first step of the research was observation the campus field to known the areas covered by weeds. Later, there are two mean locations are front and backyard of campus. The census squares method was used to make 20 sample plots measured at 1 x 1 meter square. Identification on plant species inside the observation plot is conducted directly based on characteristic and morphological from every species found. If there are unknown species found, so a herbarium sample is made for further identification [3].

The Summed Dominance Ratio (SDR) values ware measured to find the dominance each species found. SDR values get from the formula as fellow [4]:

\[
\text{Density (D)} = \frac{\text{certain individual number in an observation plot}}{\text{certain species density}}
\]

\[
\text{Relative Density (RD)} = \frac{\text{certain species density}}{\text{all species density}}
\]

\[
\text{Frequency (F)} = \frac{\text{total of observation plots occupied by certain species}}{\text{certain species frequency}}
\]

\[
\text{Relative Frequency (RF)} = \frac{\text{certain species frequency}}{\text{all species frequency}}
\]

\[
\text{Dominance (Do)} = \frac{\% \text{area covered by a species}}{\text{all species dominance}}
\]

\[
\text{Relative Dominance (RDo)} = \frac{\text{certain species dominance}}{\text{all species dominance}}
\]

\[
\text{Important Values Index (IVI)} = \text{RD} + \text{RF} + \text{RDo}
\]

\[
\text{Summed Dominance Ratio (SDR)} = \frac{\text{RD} + \text{RF} + \text{RDo}}{3}
\]

3. Result and Discussion
The Important Value Index (IVI) is quantitative parameter that can be used to state domination level (dominance level) of certain species in one plant community. The dominant species in one plant community will have high important value index, so that the dominant species of course would have the highest important value index [3]. In this research, *Sphagnicola trilobata* is the species which have the highest important value index of 1.587 (Table 1.). Its mean that this plant has the highest level of domination in the observation plots.

The Summed Dominance Ratio (SDR) values describe the species ability to growth dominate in the area. The more SDR value, more dominance a species. The result of this research showed in Table 1. There are eight species identified. *S. trilobata* is the species which have the highest SDR value
(0.529), followed by Tridax procumbens, Mimosa pudica, and Ageratum conyzoides with SDR values of 0.151, 0.104, and 0.074 respectively.

| Species                  | D   | RD  | F   | RF  | Do  | RD0 | IVI  | SDR  |
|--------------------------|-----|-----|-----|-----|-----|-----|------|------|
| Ageratum conyzoides      | 94  | 0.039 | 9  | 0.143 | 80  | 0.041 | 0.223 | 0.074 |
| Cosmos caudatus          | 5   | 0.002 | 1  | 0.016 | 5   | 0.003 | 0.021 | 0.007 |
| Emilia sonchifolia       | 54  | 0.022 | 6  | 0.095 | 54  | 0.028 | 0.146 | 0.049 |
| Galinsoga parviflora     | 9   | 0.004 | 1  | 0.016 | 2   | 0.001 | 0.021 | 0.007 |
| Mimosa pudica            | 206 | 0.085 | 10 | 0.159 | 129 | 0.067 | 0.311 | 0.104 |
| Sphagneticola trilobata  | 1606| 0.666| 17 | 0.270 | 1260| 0.651 | 1.587 | 0.529 |
| Synedrella nodiflora     | 135 | 0.056 | 7  | 0.111 | 140 | 0.072 | 0.239 | 0.080 |
| Tridax procumbens        | 304 | 0.126| 12 | 0.190 | 265 | 0.137 | 0.453 | 0.151 |

There are several methods that can be used, to control weeds after the weeds exist. It is known as responsive method that could be done by using the physical, mechanical, biological, or chemical control. Usually, the physical control could be done by uprooted the weeds by hand directly. The mechanical control was the control method by using some equipment like scissor or mower. The chemical control could be done by using the chemical agent we call herbicides. Both of mechanical and chemical control is the most control method using in campus.

Each species identified known has a beneficial function to human. For example, A. conyzoides was a traditional medicine in Indonesia which can help to treat the minor skin injured. In plant protection, this weed has a potential to be a botanical insecticide. Some research showed that the extract of A. conyzoides has the insecticidal activity against Rhyzopertha dominica, Periplaneta Americana, Diapania hyalinata, and Musca domestica [5]. The volatile oil of A. conyzoides has insecticidal activity against cowpea weevil, Callosobruchus maculatus [6].

C. caudatus and E. sonchifolia are the Asteraceae herb, have some biological activity like antibacterial, antifungal, anti-hypertensive, and anti-diabetic activity, and it’s known as traditional medicine in many countries [7][8]. C. caudatus known has antifungal activity against some plant pathogens, so it has a potential to become a botanical fungicide [9], and it has a potential as botanical insecticide because a research showed that the leaf extract of C. caudatus has mortality effect to a rice pest, Sitophilus oryzae [10].

G. parviflora usually used as fodder for cattle, but human also use as a vegetable. Crude extracts and pure compounds isolated from the plant possess potent pharmacological activity such as antimicrobial, antifungal, antioxidant, anti-inflammatory and nematicidal effects [11]. G. parviflora leaves showed the significant presence of flavonoid, tannins, quinines and cellulose, in flower contain significant amount of flavonoid, glycosides, carbohydrate, tannins, quinines, cellulose and steroids [12].

M. pudica known has pharmacological effect. Traditionally, it is used in the treatment of some diseases like leprosy, dysentery, vaginal and uterine complaints, inflammations, burning sensation, asthma, leucoderma, fatigue and blood diseases [13]. In plant protection, the extracts of M. pudica has insecticidal activity against Aedes aegypti L, Anopheles sp. [14], maize weevil, Sitophilus spp, and Tribolium confusum [15].

S. trilobata and S. nodiflora ecologically has a function as refuge for beneficial insect habitats [16], so we can manage them to get their optimum function as refuge. In the other side, it has some insecticidal activity against some insect such as Culex ppiens and Crocidolomia pavonana (Cabbage caterpillar) [17][18]. The SDR value of this plant (0.529) showed that it is dominate more than 50 % of demonstrated area.
T. procumbens known has a larvicidal activity against mosquito Culex quinquefaciatus [19], and insecticidal activity against white flies Bemisia tabaci [20], it is showed the potential of this plant to use as botanical pesticides. The other research showed that the extract of T. procumbens has a phytotoxicity effect. Phytotoxicity is the term used to describe the toxic effect of chemical compounds on growth and development of plant [21] which shown the potential of a plant to use as botanical herbicides. When we know the potential or the beneficial aspect of some weeds, we have some choices to manage them wisely.

4. Conclusion
There are eight species identified in the observation plots, Sphagneticola trilobata is the most dominant weed species in Universitas Perjuangan of Tasikmalaya, with SDR value of 0.529, followed by Tridax procumbens and Mimosa pudica with SDR values of 0.151 and 0.104 respectively.

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