

¹Viktor József VOJNICH, ²Endre PÖLÖS, ³András PALKOVICS, ⁴Ferenc BAGLYAS

EXAMINATION OF WEED VEGETATION OF A VINEYARD ON SANDY SOIL

¹⁻⁴ Pallas Athena University, Faculty of Horticulture and Rural Development, Kecskemét, HUNGARY

Abstract: Weeds are particularly competitive with grapes on sandy soil. They extract water and nutrients from the crops besides they shade plants. A weed survey was carried out in the demonstration vineyard of the Faculty of Horticulture and Rural Development of Pallas Athena University, in Kecskemét, in Hungary. The coenological survey was in 10th September 2015. The recordings were made in 5 x 2 m plots with Braun-Blanquet methods. Factors affecting of weed communities: 1. Grown in culture; 2. Climatic factors; 3. Soil type; 4. Soil cultivation; 5. Methods of weed control; 6. Allelopathy. We found four types of weed communities: 1. Puncture vine (*Tribulus terrestris*); 2. Common purslane (*Portulaca oleracea*); 3. White goosefoot (*Chenopodium album*); 4. Bindweed (*Convolvulus arvensis*).

Keywords: weed control, soil cover, allelopathy, vineyard, Braun-Blanquet methods

INTRODUCTION

It is well known that the field and horticultural crop production have among the primary factors reducing crop of weed plants. The weeds in the early stages of cultivation, when people of different wild plants were placed in culture, mass appeared in the sowing of crops such as pests. Since then the ecologically better adapted to characterize weeds and cultivated plants are less adaptable ceaseless struggle between them. The soil cultivation, plant care, in general, is that modern agricultural technology to, determines how much damage caused by weeds. The loss is estimated to reach 25-30% respectively.

Factors affecting weed associations:

- Cultivated culture
- Climatic factors
- Soil type
- Soil cultivation
- Weed control methods
- Allelopathy

Weed associations characterized by:

- Influenced by human activity
- Varied in appearance, often a result of random events occurs
- High degree of adaptation, tolerance
- Low stability in
- A large proportion of invasive adventives species
- Due to anthropogenic influence is difficult to organize
- Are spreading due to the natural environment disturbance.

The aim of the experiment was to examine how the above mentioned factors affect the composition of the weed flora in the investigated territory.

MATERIALS AND METHODS

A weed survey was carried out in the demonstration vineyard of the Faculty of Horticulture and Rural Development of Pallas Athena University, in Kecskemét, in Hungary. The area was

added to coenological comment carried out on 10 September 2015. The survey was weighed and phytosociological survey was carried out 5 x 2 meter area. The quadrates were evaluated Braun-Blanquet's method [1].

The definition of weed:

- Ujvárosi [2]: The natural vegetation does not occur only in the areas of culture, or members of the ancient vegetation, but cultivated areas conquered space.
- Lehoczky [3]: Weed is any plant which there occurs where undesirable.
- Holzner [4]: A man weeds growing plants best adapted to the activities that significantly affect agricultural cultivation.
- Bunting [5]: The weeds are pioneer species in secondary succession.
- Hunyadi [6]: Weeds are called plants or plant parts (rhizome, onion, etc.) of any stage of development which occur where it is not desired.

The emergence of the weed plant of vegetation was adaptation to the environment formed by man. Any weed plant can be considered harmful to us under the circumstances.

According of habitats:

- field, pasture;
- cutting areas;
- disturbance areas, around of human domiciles

The damages caused by pest's weeds forms:

- The habitat occupation
- The use of soil water reserves
- The use of nutrient stocks
- Parasitism
- Intermediate hosts of diseases, of pests propagation
- Increasing the cost of production
- Value of the downgrading
- Toxic weeds [2].

We found four types of weed communities:

- Puncture vine (*Tribulus terrestris*)
- Common purslane (*Portulaca oleracea*)
- White goosefoot (*Chenopodium album*)
- Bindweed (*Convolvulus arvensis*)

Puncture vine (*Tribulus terrestris*)

T. terrestris is an annual plant. The plant is slim, 60 cm height. Time of flowering was from July till late autumn. The flower colour is yellow. Spread through the tropical and subtropical areas. Nowadays is a cosmopolitan species. In Hungary of the Great Plains hacked in the loose, dry, wind blew, sandy soil was very common. Puncture vine was one of the most unpleasant weeds in Hungary.

In open fields, it is mostly found in capture cultures and stubble, but it is often found in gardens and vineyards. In cereals (if they are rare) they reach development until flowering. *Tribulus terrestris* disinfected with stubble and cereals at the end of summer. Where the soil was richer in humus, and ceases its quicksand nature, the Puncture vine is no longer alive. Life forms: T₄ (annual plant, germination of spring, flowering of late summer) [2, 7, 8].

Bindweed (*Convolvulus arvensis*)

C. arvensis is a perennial plant; bindweed was one of the most common arable weeds. The underground stems and roots can also go down to a depth of 2-3 meter of soil. Time of flowering was from early June till the first autumn frost. The flowers are white or pink. Throughout the world was spread and is one of the most pernicious weeds. It was originally in Europe and Asia was native to warmer regions, spread out in all directions here. In Hungary of the Great Plains Plain high levelled in the hot, dry regions of strongly bound soils, especially clay of meadow.

It is common in fields, gardens, orchards, vineyards, roads, artificial or planed grasslands. The damage is very large, because it not only takes up the place of the crop and takes away the food, but it is overshadowed by its massive foliage, it is hindered by its close attachment to development and, in particular, it is a major cause of the collapse of cereals.

It also tolerates the highest dryness, because its roots penetrate to the constantly damp ground floor several meters deep. *Convolvulus arvensis* does not like shading. Regular autumn deep plowing and crop density significantly suppresses the spread. Life forms: G₃ (in soil for wintering perennials) [2, 7, 8].

White goosefoot (*Chenopodium album*)

C. album is a most common annual weed. White goosefoot was not only in the open fields, but all the nutrient-rich cultures occur. The plant height was 20-150 cm. Time of flowering was from mid-June till autumn (frosts onset). The flower colour is green. It is spread all over the Earth except the polar circles.

In Hungary, it is very common in all kinds of soil, both in arable land and on plains, along roads, in gardens, in vineyards, everywhere where humus is disturbed. Frequent in all types of crops, but mainly in cereals. The soil is full of seeds, and

when humidity is ensured, it sprouts well from spring to autumn. *Chenopodium album* damage is very high, because he grows fast and does not absorb the food and the water from the sown plant, but it completely overshadows and destroys it. Gardens, vineyards can only defend against constant hoeing. Life forms: T₄ (annual plant, germination of spring, flowering of late summer) [2, 7, 8].

Common purslane (*Portulaca oleracea*)

P. oleracea is an annual plant, 15-30 cm height, succulent's plant. The sandy soil was of most burdensome weeds. Time of flowering was from July till frosts. The flower colour is yellow. Today almost on the Earth carried into temperate zone and warm zone, cosmopolitan species. It is spread in Hungary in sandy and loamy soils, but especially in the loose sand area.

In some places it is still heavily saline soils. In the middle of summer, it is found in large quantities in all cereals and stubble, in gardens, in vineyards, on cracked sandy soils, on abandoned fields, along roads, but especially in sandy garden and vineyards. Its seeds are large in the soil, they are full of reality.

After each hoeing, a new seed begins to germinate. It is precisely this property that we use to control it, because in this way we can spill it out of the soil in almost unlimited quantities, and gradually deepen the cultivation, and we can clean the top layer of the soil. It is extremely sensitive to freezing and in the late May frosts and in the autumn, the first dwarf completely destroys it. The heat of summer was incredible to grown rapidly. Life forms: T₄ (annual plant, germination of spring, flowering of late summer) [2, 7, 8].

RESULTS

- The area we were able to isolate four weed territories:
- Puncture vine (*Tribulus terrestris*) (Table 1 and Figure 1);
- Bindweed (*Convolvulus arvensis*) (Table 2 and Figure 2);
- White goosefoot (*Chenopodium album*) (Table 3 and Figure 3);
- Common purslane (*Portulaca oleracea*) (Table 4 and Figure 4).

Table 1. Puncture vine (*Tribulus terrestris*) area

Plant species	Casing (%)	A-D value
<i>Tribulus terrestris</i>	50	3-4
<i>Portulaca oleracea</i>	10	2
<i>Digitaria sanguinalis</i>	10	2
<i>Setaria viridis</i>	5	1-2
<i>Amaranthus retroflexus</i>	5	1-2
<i>Melandrium album</i>	0.5	+

Table 2. Bindweed (*Convolvulus arvensis*) area

Plant species	Casing (%)	A-D value
<i>Convolvulus arvensis</i>	60	4
<i>Portulaca oleracea</i>	10	2
<i>Eragrostis poaeoides</i>	5	1
<i>Setaria viridis</i>	3	+1
<i>Amaranthus retroflexus</i>	5	1



Figure 1. Puncture vine (*Tribulus terrestris*) area

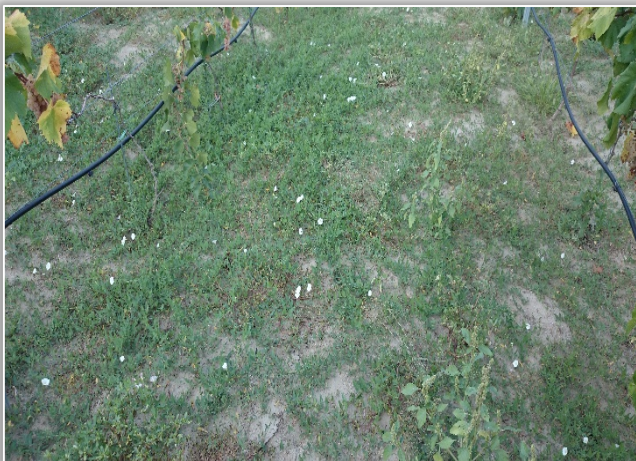


Figure 2. Bindweed (*Convolvulus arvensis*) area



Figure 3. White goosefoot (*Chenopodium album*) area

Table 3. White goosefoot (*Chenopodium album*) area

Plant species	Casing (%)	A-D value
<i>Chenopodium album</i>	30	2-3
<i>Portulaca oleracea</i>	10	1-2
<i>Chenopodium aristatum</i>	5	1
<i>Amaranthus retroflexus</i>	5	1
<i>Eragrostis poaeoides</i>	5	1
<i>Agropyron repens</i>	3	+ -1
<i>Ailanthus altissima</i>	0.5	+



Figure 4. Common purslane (*Portulaca oleracea*) area

Table 4. Common purslane (*Portulaca oleracea*) area

Plant species	Casing (%)	A-D value
<i>Portulaca oleracea</i>	70	4-5
<i>Eragrostis poaeoides</i>	10	2
<i>Chenopodium aristatum</i>	5	1-2

All four examined areas can be found in common purslane (*Portulaca oleracea*). Three places were found in *Amaranthus retroflexus* and *Eragrostis poaeoides*. Two study areas there are *Setaria viridis* and *Chenopodium aristatum*.

CONCLUSIONS

- On the sandy soil has a low humus content of extreme dryness tolerant weeds typically: *Tribulus terrestris* and *Portulaca oleracea*.
- On the sandy soil warm up quickly accumulating weeds: *Chenopodium aristatum*, *Chenopodium album*, *Amaranthus retroflexus* and *Convolvulus arvensis*.
- Mechanical weed control (hoeing) forced back as a result of the perennial plant species.
- Weed species has been area with allelopathy: *Chenopodium album*, *Portulaca oleracea* and *Tribulus terrestris*.

Acknowledgements

This research is supported by EFOP-3.6.1-16-2016-00006 "The development and enhancement of the research potential at Pallas Athena University" project. The Project is supported by the Hungarian Government and co-financed by the European Social Fund.

References

- [1] J. Braun-Blanquet, Pflanzensoziologie, Grundzüge der Vegetationskunde. (3. Auflage). Springer Verlag, Wien (1964)
- [2] M. Ujvárosi, Weeds. Agriculture Publisher, Budapest (1973)
- [3] É. Lehoczky, The competition of weeds and cultivated plants for nutrients. Academic Publisher, Budapest (1994)
- [4] W. Holzner, M. Numata, Biology and ecology of weeds. Springer Netherlands, Dordrecht (1978)
- [5] A. H. Bunting, Some reflection on the ecology of weeds. Blackwell, Oxford (1960)
- [6] K. Hunyadi, Chemical weed control, Part I. University note, Keszthely (1974)
- [7] K. Hunyadi, I. Béres, G. Kazinczi, Weed species, weed biology, weed control. Agriculture Publisher, Budapest (2011)
- [8] A. Kádár, Chemical weed control and crop control. Agriculture Publisher, Budapest (2016)



ISSN: 2067-3809

copyright © University POLITEHNICA Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei, 331128, Hunedoara, ROMANIA
<http://acta.fih.upt.ro>