

## VEGETATION OF VINEYARDS – REGARDING THE RISK OF FIRE AND IMPORTANCE FOR TOURISM

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### Abstract

Vineyards are an important tourist element in the cultural landscape. The vineyards also include other types of plants. The aim of the paper is to evaluate the species composition of vegetation in terms of the potential risk of fire. The evaluation of vegetation took place in the cadastre of four wine-growing villages (Hlohovec, Horní Dunajovice, Moravský Žižkov, Sudoměřice). The wine-growing villages belong to the Morava wine-growing region. The vineyard vegetation has a diverse range of species. Based on our evaluation, 87 species were found in the monitored localities. Among the found species, there were 17 species of grasses. Grass biomass in vineyards increases the risk of fire. Vegetation in the vineyards is a potential risk for the outbreak and spread of fire.

**Key words:** vineyards, vegetation, fire risk, tourism

### Introduction

Herbaceous vegetation in inter-rows protects the soil from water erosion, enriches the soil with organic matter and prevents rinsing of nutrients both on the soil surface and their leaching to the lower horizons of soil (Retallack 2010). There are a number of ways to care for vineyards. The most important methods concern weed control, soil protection and soil water management. The differences in vineyard management must take into account the age of the vines, the design of the vineyards, the type of soil and the production area (Martinson, Hellman, 2015). Tourists are attracted to the vineyards as well. Tourism is closely tied to vineyards and wine production in several locations.

As a result of increased tourism, arson attack has increased by as much as 26 %, and in Spain, it is almost 55 %. This situation is accentuated by poor urban planning that allows the embedding of communities within or in the vicinity of forested areas, classified as wildland-urban interface (WUI), with little public understanding, participation in forest protection, and infrastructure measures (Goldammer, 2013; WWF, 2019). The increased threat of fire has led to several measures, including changes in vegetation management (Porter et al., 2021). The paper aims to evaluate vegetation species composition regarding the potential risk of fire.

### Materials and methods

The evaluation of vegetation took place in the cadastre of four wine-growing villages (Hlohovec, Horní Dunajovice, Moravský Žižkov, Sudoměřice). The wine-growing villages belong to the Morava wine-growing region, located in a maize production area with a hot and dry climatic region. The average annual temperatures in this area are 8 - 10 ° C and the average annual precipitation is about 500 - 600 mm.

The system of floristic inventory of found species was used to assess the vegetation. The evaluation took place in July 2017 and 2018. The scientific names of individual plant species were determined according to the Pladias database (Pladias, 2020).

It was possible to go through some areas of the vineyards on our designated paths. During this route, all found plant species were recorded. At the end of the pass, the following species were evaluated using a simple three-point scale:

3 - numerous species with a dominant occurrence (dominant species)

2 - common species with abundant occurrence only in some places of the vineyard (subdominant species)

1 - rare species with a small and rare occurrence

The found species were divided into groups according to their biological properties and their relation to fire risk.

## Results

During the monitoring of vineyards in selected localities, 87 species of plants were found. Table 1 shows the numbers of plant species found in the monitored vineyards. Species are further divided according to selected criteria.

Tab. 1: Number of species in vineyards found in monitored localities

Wine-growing villages	Viniční trat'	Perennial grasses	Annual grasses	Perennial dicots	Annual dicots
Moravský Žižkov	Stará hora	4	3	10	12
	Sahara	3	4	14	11
Sudoměřice	Staré hory	5	3	17	8
	Vápenky	4	1	14	6
	Díly za zahradou	4	3	11	6
Hlohovec	Šulaperk	4	5	12	15
	Stará hora	3	5	15	11
	Dělice	2	1	11	10
Horní Dunajov	Stará hory	3	2	7	4
	Frédy	3	2	13	10

Perennial grasses represent the first group of species. Such species are: *Arrhenatherum elatius*, *Calamagrostis epigejos*, *Dactylis glomerata*, *Elytrigia repens*, *Fallopia convolvulus*, *Festuca pratensis*, *Festuca rubra*, *Lolium perenne*, *Poa pratensis*.

The second group consists of annual grasses. The occurring species are: *Bromus hordeaceus*, *Bromus sterilis*, *Bromus tectorum*, *Digitaria sanguinalis*, *Echinochloa crus-galli*, *Hordeum murinum*, *Setaria pumila*, *Setaria viridis*.

The third group are perennial dicots. Species as *Agrimonia eupatoria*, *Achillea collina*, *Achillea millefolium*, *Artemisia absinthium*, *Artemisia vulgaris*, *Carduus acanthoides*, *Centaurea jacea*, *Cichorium intybus*, *Cirsium arvense*, *Convolvulus arvensis*, *Crepis biennis*, *Crepis tectorum*, *Daucus carota*, *Echium vulgare*, *Falcaria vulgaris*, *Galium album*, *Glechoma hederacea*, *Hieracium pilosella*, *Inula hirta*, *Lathyrus tuberosus*, *Linaria vulgaris*, *Lotus corniculatus*, *Malva neglecta*, *Malva verticillata*, *Medicago falcata*, *Medicago lupulina*, *Onobrychis viciifolia*, *Pastinaca sativa*, *Picris hieracioides*, *Plantago lanceolata*, *Plantago major*, *Potentilla arenaria*, *Reseda lutea*, *Salvia nemorosa*, *Salvia pratensis*, *Securigera varia*, *Silene latifolia*, *Taraxacum* sect. *Ruderalia*, *Trifolium aureum*, *Trifolium pratense*, *Trifolium repens*, *Vicia cracca* were found in there.

The fourth group are annual dicots. The occurring species are: *Amaranthus powelli*, *Amaranthus retroflexus*, *Arenaria serpyllifolia*, *Atriplex patula*, *Capsella bursa-pastoris*, *Cerastium arvense*, *Consolida regalis*, *Conyza canadensis*, *Epilobium ciliatum*, *Erigeron annuus*, *Erodium cicutarium*, *Geranium dissectum*, *Geranium pusillum*, *Geum urbanum*, *Chenopodium album*, *Chenopodium hybridum*, *Chenopodium pumilio*, *Lactuca serriola*, *Mercurialis annua*, *Panicum miliaceum*, *Polygonum aviculare*, *Portulaca oleracea*, *Senecio vulgaris*, *Solanum nigrum*, *Trifolium arvense*, *Trifolium incarnatum*, *Tripleurospermum inodorum*, *Viola arvensis*.

## Discussion

In Europe, the main causes of fires are meteorological conditions, especially the warm and very dry summer months. In addition to climatic conditions, unused pastures with large amounts of dead grass biomass also increase the fire risk (Mohamed et al., 2020). The biomass of some grasses produces substances that allow spontaneous combustion. Grass biomass burns quickly during fires, resulting in high temperatures that burn other species, including trees (Dillon et al., 2021).

Grasses represent a significant source of risk for fire (Ryspekov et al., 2021; Winkler et al., 2021). Grass species are an important part of vineyard vegetation in Moravian vineyards (Lišková et al., 2016; Maxianová et al., 2016; Ragasová et al., 2019).

Dicotyledonous species (including vines) produce biomass that allows fires to continue. Dicots are often intentionally sown. Their various ecosystem functions are evaluated positively (Ragasová et al., 2021).

Vineyards are important for the development of tourism in the regions. Increased tourist raises the risk of fire, particularly during the summer. The vineyard vegetation's species composition has the ability to cause the fire to erupt and spread farther. Vegetation management plays an important role here.

## Conclusion

Vineyards have an essential role in the cultural environment as a tourist attraction. The vineyards also include other types of plants. The vegetation of the vineyards is very rich in species. Based on our evaluation, 87 species were found in the monitored localities. Of the species found, 17 were grass species. Grass biomass in vineyards increases the risk of fire. Vegetation in the vineyards poses a risk of the outbreak and spread of fire.

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## Souhrn

Vinice jsou významný turistický prvek v kulturní krajině. Součástí vinic jsou i další druhy rostlin. Cílem článku je zhodnotit druhové složení vegetace z pohledu potenciálního rizika vzniku požáru. Hodnocení vegetace vinic probíhalo v katastru čtyř vinařských obcí (Hlohovec, Horní Dunajovice, Moravský Žižkov, Sudoměřice). Vinařské obce patří do vinařské oblasti Morava. Vegetace vinic je druhově velmi bohatá. Na základě našeho hodnocení bylo nalezeno 87 druhů ve sledovaných lokalitách. Z nalezených druhů bylo 17 druhů trav. Biomasa trávy ve vinicích zvyšuje riziko vzniku požáru. Vegetace ve vinicích je potenciálním rizikem pro vznik a šíření požáru.

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