

THE BASIC SITE CHARACTERISTICS OF THE SPECIES *CARPESIMUM ABROTANOIDES* L.

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In the forest "Crni Lug", the plant *Carpesium abrotanoides* L. was identified for the first time as a new species in the flora of Serbia. The plant is abundant in the drained depressions under monodominant forest stands of narrow-leaved ash and along the fringe of such stands. However, its optimal sites are the open and semi-open, somewhat moister deeper depressions, where the species builds dense populations.

Key words: *Carpesium abrotanoides* L., site, forest "Crni Lug", game

INTRODUCTION

The species in the genus *Carpesium* L. (Fam. Asteraceae Dum.) are distributed in south Europe, in the temperate Asia and in the subtropical Asia. In Serbia, in addition to *Carpesium cernuum* L. (GAJIĆ, 1975), another species in the genus *Carpesium* - *Carpesium abrotanoides* L. was recorded in the forest "Crni Lug", near the village Boljevac, along the river Sava, about 30 km far from Belgrade (RADULOVIĆ, 2002).

Carpesium abrotanoides was described by Line in 1753. The synonyms are *C. Wulfenium* Schreb., *C. Wulfenii* Schreb. (Soó, 1970), *C. wulfenianum* Bertol.

(TUTIN, 1976) and *C. thunbergianum* SIEBOLD.& ZUCC. (2002b). It is a perennial plant, up to 1m high. Its lateral almost horizontal branches are alternatively arranged along the main stem axis (monopodial growth) (Fig. 2). Individual flower heads are in leaf axils, both on the main stem, and on the lateral branches. Sometimes flower heads are arranged in clusters, without the leaves (FRITSCH, 1909). The flowers are hermaphroditic, yellow. It flowers in the autumn (2002b).

The range of the species is south Europe, middle Mediterranean and east Asia (SOÓ, 1970; 2002b). Flora Europaea records it in Italy (without Sardinia and Sicily), in Hungary and Yugoslavia. The datum on the species distribution in Yugoslavia refers to Croatia, now a separate state (RADULOVIĆ, 2002).

C. abrotanoides L has a series of medicinal properties; it is used as an insecticide, and its foliage is used in human nutrition (2002b).

The forest "Crni Lug" belongs to the management unit Progarska Ada - Crni Lug - Zidine - Drenska and its main "global purpose" is wood production, but since 1986 its priority function is the rearing and hunting of large game (deer and boar). The fenced part of the hunting ground is 720 ha (Map 1). It was in the forest "Crni Lug" that *C. abrotanoides* L. was identified for the first time, as the new species in the flora of Serbia and for the time being, it is the only detected locality. The aim of this paper is to present the basic characteristics of the site inhabited by *C. abrotanoides* in the forest "Crni Lug".

METHOD

The site characteristics (the soil and the regime of flood and ground waters) are described based on the available literature.

The floristic composition and the structure of plant cover was studied by the standard Braun-Blanquet method.

SITE ELEMENTS

The study area is formed according to all laws of the alluvial plain formation in the lower course of a large river - by the alternation of ridges and depressions mainly parallel to the river. The elevations range within the scope of 2.5 m. Depressions or troughs are interesting in this case because *C. abrotanoides* is the most numerous in such places. As the area was and still is under the anthropogenic effect, and as we do not have the data on the depth of ground water, we shall reconstruct in general the changes which occurred in the depressions.

By the construction of embankment in 1912 (1996), it can be stated that the effect of floodwater was excluded, but there remains the effect of ground water. The network of channels for the drainage of the adjacent agricultural soil, as well as the channel along the forest complex, 2m deep, does not exclude the effect of ground water at the time of high water level of the river Sava (Fig. 1). In mid nineties, three Renney wells were constructed along the river Sava. The depth of ground water intake in the alluvial sediments is about 25 m (1996), but there are

no data available on the horizontal effect of Renney wells. The people working in this hunting ground say that the depressions have had no water already for more than a decade. It can be stated that the effect of ground water is lowered both due to drainage channels and due to the effect of Renney wells.

The soil is meadow brown loamy in the lower half and meadow brown clayey in the upper half of the hunting ground (ANTONOVIC *et al.*, 1976). Although there are 18 soil profiles, none of them is bored in the depression, but it can be concluded that there the "ground water is closer ...".

A part of the former bed of the pool "Živača"- "Blatina" is a part of the hunting ground. The soil is mineral marshy-bog type. The channel has improved (at least partly) the gleyed clay soil in this somewhat deeper depression (ANTONOVIC *et al.*, 1976).

RESULTS

Carpesium abrotanoides L. appeared in the hunting ground about four years ago (according to the observations of the people who manage the hunting ground "Crni Lug"). Today this species grows throughout the territory of the hunting ground - individually. It often makes the facies along the fringe of the forest and rides, in the gentle hollows (human induced). It is most numerous in the drained depressions. *C. abrotanoides* L. is one of the most numerous species under the forest of dense canopy, but with poor undergrowth and with a low degree of coverage of the ground layer, but it does not exceed 10 %. Examples:

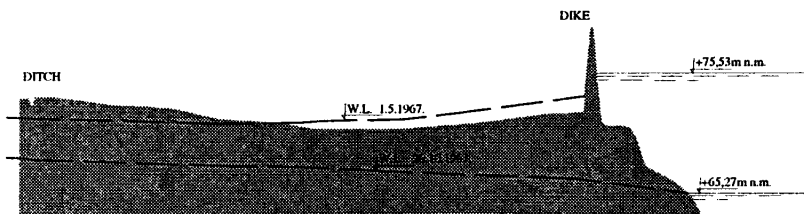


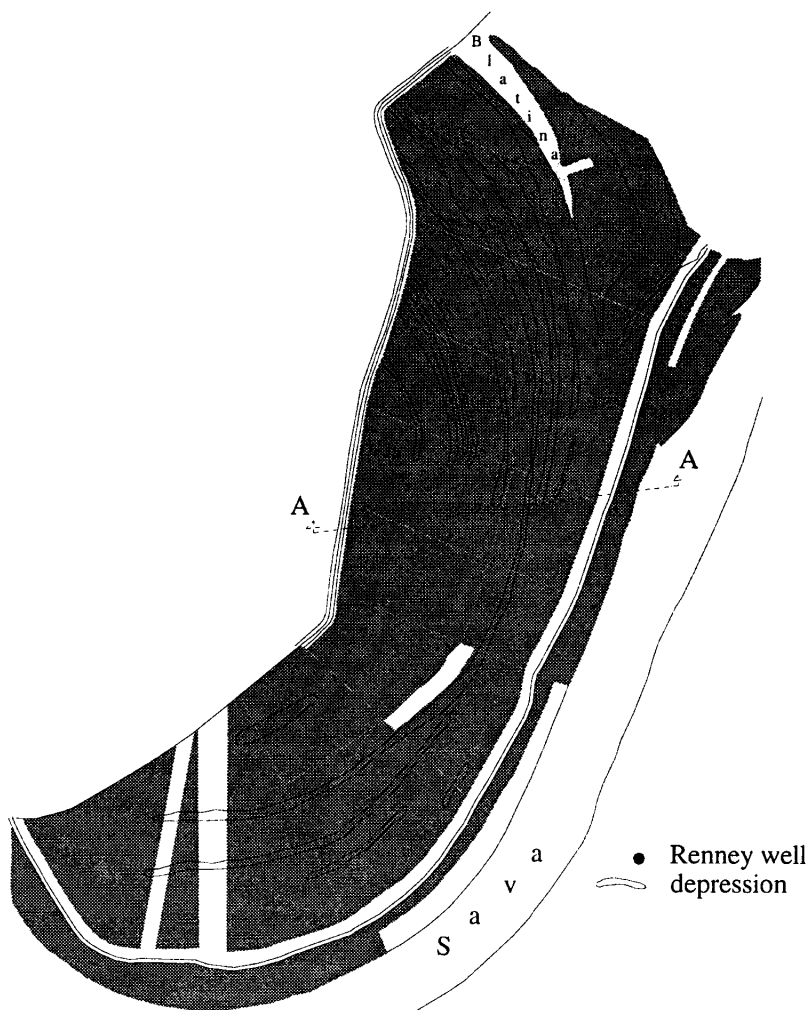
Fig. 1 - Cross section "A-A": Ground water levels. Energoprojekt', after (1996)

• Locality "Duga Bara":

The stand has a dense canopy 0.7 and narrow-leaved ash (*Fraxinus angustifolia* Vahl.) is the dominant species. Ash is of natural origin, the trees are distorted, diameter about 25 cm, age about 50 years (2000), pedunculate oak (*Quercus robur* L.) occurs along the fringe. In the shrub layer, *Ulmus effusa* Willd. R, *Cornus sanguinea* L. R occur individually. The coverage degree of the ground layer is about 30 %: *Carpesium abrotanoides* L. 1.1, *Rubus caesius* L. 1.1, *Carex remota* L. +.3, *Festuca* sp. +, *Lysimachia nummularia* L. +.2, *Oxalis stricta* L. +, *Ulmus effusa* Willd. +, *Dactylis glomerata* L. +.2, *Rumex sanguineus* L. +.

• Locality "Savska Mlaka":

Monodominant and artificially established stand of narrow-leaved ash. The trees are straight, diameter about 25 cm, age about 30 years, the canopy is 0.7. The shrubs are thin: *Ulmus effusa* Willd. +, *Crataegus monogyna* Jacq. +; *Amorpha fruticosa* L. +, *Cornus sanguinea* L. +. The degree of coverage in the ground layer is about 40 %: *Brachypodium silvaticum* R.et Sch. 1.3, *Carpesium abrotanoides* L. 1.1, *Carex remota* L. 1.3, *Urtica dioica* L. +, *Cornus sanguinea* L. 1.1, *Fraxinus angustifolia* Vahl. +, *Amorpha fruticosa* L. +, *Stenactis annua* Nes. +, *Crataegus monogyna* Jacq. +, *Clematis vitalba* L. +, *Carex* sp. +.3.



Map 1 - Index map of the forest 'Crni Lug', 1995. god, Radulovic S.



Fig. 2 - *Carpesium abrotanoides* L. Javorka S., Csapody V.

In the depression "Blatina", which belongs to the former pool "Živača" - in the open and semi-shaded place, *Carpesium abrotanoides* L. covers everything. Population density and individual vigour within the population indicate that this site is the most suitable for this plant.

During the reconnaissance period, late summer - early autumn, we did not observe any damage on *C. abrotanoides* L. caused by the game.

DISCUSSION

Due to the absence of exact data on the state of the site elements (primarily, the depth of ground water), we can use the plant species as the synthetic site indicators, or even better, a group of plant species. The conclusions at this site are made more complex by the fact that forest stands are under the direct effect of silvicultural measures, and also the harvesting operations. From the historical aspect (since 1903), this is the space managed by forest succession - artificial method of forest regeneration, forest-range management, etc. Such management method conditioned the formation of pure pedunculate oak and pure narrow-leaved ash stands on a large part of the study area (2000). The beginning of the terrestrial process in the soil (by lowering the level of ground water), shaded ground (0.7), and the species which compose the shrub layer and the ground flora layer in narrow-leaved ash stands, indicate today that in this zone, in the drained depressions, it could be the case of the sites of somewhat drier communities, which continue syndynamically on the as. *Fraxinetum angustifoliae* Jov. et Tom. - similar to the sites of *C. abrotanoides* L. in Hungary (Soó, 1970). Soó R. reports that this species belongs to the communities of the felled areas of the alliance *Calystegion*, and it occurs along the edge of the forest communities *Fraxineto-Ulmetum praeillyricum* and *Querceto-Ulmetum hungaricum*. *Carpesium abrotanoides* L. also

occurs in the vigorous ground cover of the forest of pedunculate oak-ash-elm, in the National Park "Dunav - Drava" in the south of Hungary (2002). As opposed to the locality in the National Park, in our case (hunting ground), the ground cover in the narrow-leaved ash forest is thin, both in the spontaneously growing stands and in the forests of artificial origin.

The opinion that the plant requires average to well drained soil (2002b) in the study area refers to those soils which are under forest vegetation. Also, according to the same source, when the species grows on semi-shaded or open spaces, it requires the moist soil. In the study area this refers to the deeper depression "Blatina", with partly meliorated gleyed clay soil.

As reported by the foresters who manage the hunting ground, the game (deer and boar) avoids this plant, and also no damage was observed in the field. On the other hand, cooked leaves of this plant are used in human nutrition - it has sweet taste and specific smell ("the smell of foxes" - KNUCKLE., 1984; REID., 1977, after 2002b). The above facts should draw the attention of the experts in the appropriate fields, because this plant forms a considerable biomass at its optimal site.

The statement that *Carpesium abrotanoides* appeared in the hunting ground about four years ago means that at that time this herbaceous species became abundant, and thus noticeable in the field. Associating the fact of the game origin (Baranja) and the fact that the species *C. abrotanoides* L. has not been recorded at the same or similar sites in the neighbourhood of "Crni Lug", points to the hypothesis that it was carried to these areas from Baranja (forest hunting ground "Jelen") during the period of introducing the game 1986 - 1989 (1999) and then it was subspontaneously disseminated by means of the game, as the vector of carrying the achenes or capitulas of this plant further throughout the hunting ground.

CONCLUSION

The study area was and remains under the anthropogenic effect first of all due to the modified regime of floodwater and ground water - by the construction of embankments, drainage channel network and by the construction of Renney wells. Also, this is the area which was managed by forest succession intended for wood production, and from 1986 also for rearing and hunting the large game. *Carpesium abrotanoides* L. appears individually, in such modified sites, throughout the territory, and it builds the facies along the edge of the forest in gentle hollows. It is the most frequent in the drained depressions:

- In the monodominant forest stands of ash (*Fraxinus angustifolia* Vahl.) of dense canopy (0.7) *C. abrotanoides* L. is one of the most numerous species in the thin ground layer - not exceeding 10% of the coverage, either in the stands of natural origin or in artificially established stands. The beginning of the terrestrial processes in the soil in the drained depressions leads to a conclusion that it can be the case of the sites of somewhat drier communities, which are syndynamically continued to as. *Fraxinetum angustifoliae* Jov. et Tom. (TOMIĆ and JOVIĆ, 2002).

• In the open and semi-open localities of the depression "Blatina" (the former pool "Živača"), this plant composes a dense population. Based on the number of individuals and their vigour, it can be concluded that this locality is the optimal site of the species *C. abrotanoides* L. in the hunting ground - on the partly meliorated gleyed clay soil.

The game avoids *C. abrotanoides* L. in its diet, but it is the vector of disseminating the species throughout the hunting ground.

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OSNOVNE KARAKTERISTIKE STANIŠTA VRSTE
***CARPESIMUM ABROTANOIDES* L.**

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I z v o d

U šumi "Crni lug" prvi put je izdvojena biljka *Carpesium abrotanoides* L. kao nova vrsta za floru Srbije. Biljka je brojna u dreniranim depresijama pod monodominantnim šumskim sastojinama poljskog jasena i rubom tih sastojina. Međutim, optimalno stanište predstavljaju otvorene i poluotvorene nešto vlažnije dublje depresije, gde vrsta gradi guste populacije.

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