PAEONIO PEREGRINAE – CARPINETUM ORIENTALIS ASSOCIATION ON TULCEA HILLS DIHORU ET DONIȚĂ, 1970

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This paper deals with the *Paeonio peregrinae – Carpinetum orientalis* association, identified on Tulcea hills, association described in Dobrogea, but which has not been mentioned in this area before.

Key words: phytocenology, *Paeonio peregrinae – Carpinetum orientalis*.

INTRODUCTION

The hills of Tulcea spread from East to West over 54 km and there are around 27 km from the northernmost to the southernmost point, having an area of 800 km^2 (Coteț and Popovici, 1972). Over the years, a great part of this area has been deforested or turned into agricultural land for cereal crops or vineyards. The highest tops are in Denis Tepe and Beştepe hills.

The particular geological and botanical importance of this region has been noticed some time ago, thus leading to the creation of natural reserves on certain relief segments, as follows: geological on Agighiol hill and botanical on Denis Tepe and Beştepe hills.

However, the anthropical influence in the area is still strong, being represented especially by overgrazing, reforesting and assemblage of aeolian power plants.

From the history of the vegetation research we mention the contributions of such authors as M. Andrei (1963), M. Petrescu (2007) and Anca Sârbu (2007).

MATERIAL AND METHODS

Research was carried out between 2005 and 2008, consisting in ground surveys performed according to the principles of J. Braun-Blanquet School (1964). The terminology, the biological forms and the phyto-geographical elements are those used by Ciocârlan (2000). Regarding the cenosystem, the framings in T. Chifu (2006) have been used. The analysis of the ecological indexes was based on the system adopted by Ellemberg (1974).

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RESULTS AND DISCUSSION

The association was first described in specialized literature by Gh. Dihoru and N. Doniţă (1970) and then mentioned by Cl. Horeanu in Casimcei plane (1976).

The Oriental Hornbeam forest is the most widespread type of forest in Tulcea hills, the phytocenoses of the association living on Agighiol (the most frequent forest association), Beştepe, Cartalului, Comorii hills.

The phytocenoses have been spotted at heights between 60 and 195 m, mostly on lands oriented towards the South or the North and on slopes with various inclinations (5–40°).

The association is made up of a relatively large number of species (104 species) (Table 1), with 25–38 species on the phytosociological survey. The phytosociological composition is dominated by the species characteristic to the *Quercetea pubescentis* class (around 40%), but the species characteristic to *Querco-Fagetea* and *Festuco-Brometea* class are well represented as well.

The association is made up of the *Carpinus orientalis* species, present in all surveys, generally with a great covering capacity, dominating the tree layer. The *Quercus pubescens*, *Quercus frainetto, Quercus daleschampii, Ulmus procera, Acer platanoides, Acer campestre, Tilia tomentosa, Sorbus torminalis* species add to the tree layer as well.

The shrub layer has a diversified structure, being dominated in most of the phytocenoses by *Carpinus orientalis*. The *Cornus mas* and *Crataegus monogyna* species also have significant abundance-dominance values in certain phytocenoses. The species *Rosa canina*, *Ligustrum vulgare, Pyrus pyraster, Fraximus ornus* are quite rare. The grass layer is rich and varied, being dominated by such species as: *Paeonia peregrina, Melica uniflora*, *Piptatherum virescens, Scutellaria altissima, Vinca herbacea, Geum urbanum, Viola odorata, Poa angustifolia, Fragaria viridis*, etc. The *Cornus mas*, *Crataegus monogyna* and *Quercus pubescens* add to the shrub layer. The association also has a significant number of species from *Querco-Fagetea* and *Festuco-Brometea* classes.

The analysis of bioforms (Fig. 1) points to the fact that the association has a strong hemicryptophyte character due to the predominance of hemicryptophytes. Concerning the geophytes, this association is best represented within this type of bioform of all the associations identified in the studied area. The phanerophytes are also well represented unlike the therophytes which are rather scarce.

Concerning the range of floral elements (Fig. 2), the Eurasian, European, Pontic elements with their various types are dominant, impressing a strong European character to the association. The floral range also includes few Balkan, Mediterranean, Circumpolar and Cosmopolite elements.

Table 1

Cl. QUERCETEA-PUBESCENTIS Doing-Kraft ex Scamoni et Passarge 1959
Ord.Quercetalia cerris Borhidi 1996
Al.Quercion petrae Zolymi et Jakucs in Soo 1963

Ass. Paeonio peregrinae-Carpinetum orientalis Doniță 1970

Relevé number	1	2	3	4	5	6	7	8	9	10	
Height (m.s.m.)	140	150	175	80	90	95	60	160	170	195	
Orientation	S	NV	NE	N	SV	E	N	N	S	V	
Slope (degrees)	25	5	45	20	40	20	5	5	5	5	
Covering of tree and shrub stratum (%)	50	50	95	80	60	80	95	90	95	95	K
Covering of grassy stratum (%)	85	20	5	80	70	60	50	10	5	30	
Surface (m²)	300	400	300	300	500	500	400	500	500	400	
Number of species	33	27	31	30	25	30	37	38	29	31	
Association characteristics											
Paeonia peregrina	+	+	-	-	+	3	1	+	-	-	III
Querco-Carpinion orientalis											
Allium rotundum	-	-	-	+	+	-	-	-	-	-	I
Carpinus orientalis	3	3	4	3	3	4	4	5	5	5	V
Myrrhoides nodosa	-	+	-	-	-	+	-	-	+	+	II
Ornithogalum fimbriatum	+	-	-	-	-	-	-	-	-	-	I
Piptantherum virescens	-	-	-	-	1	-	-	+	-	+	II
Pyrus pyraster	-	+	+	-	-	+	-	-	-	-	II
Quercus daleschampii	+	1	+	+	-	-	+	-	+	-	II
Quercus pubescens	-	-	1	-	+	+	1	+	+	+	IV
Fraxino orni - Continetalia											
Asparagus tenuifolius	-	+	+	-	-	+	-	+	-	+	III
Farxinus ornus	-	+	+	+	-	+	-	+	-	+	III
Galanthus plicatus	+	-	-	-	-	-	-	-	-	-	I
Geranium sanguineum	+	-	-	-	+	-	+	-	-	-	II
Quercetalia cerris s.l.											
Arum orientale	+	+	-	-	-	+	+	+	+	+	IV
Carex praecox	-	-	-	-	-	+	-	+	+	-	II
Hypericum perforatum	-	+	-	+	-	+	-	-	-	-	II
Melica uniflora	-	+	+	+	+	1	1	1	1	2	V
Potentilla argentea	+	-	+	-	+	-	-	-	-	-	II
Quercus frainetto	-	-	-	-	-		+	-	+	-	I
Rosa canina	-	-	+	-	+	-	-	-	-	+	II
Scutellaria altissima	-	1	-	-	-	-	-	-	-	+	I
Sedum maximum	-	-	-	+	-	-	-	-	-	+	I
Quercetea pubescentis											
Acer campestre	-	+	+	+	-	+	+	+	+	-	IV
Asparagus verticillatus	-	-	-	-	-	+	-	+	-	+	II

Table 1 (continued)

Asparagus verticillatus	-	-	-	-	-	+	-	+	-	+	II
Astragalus glycyphyllos	-	+	-	-	+	-	+	-	-	-	II
Cornus mas	-	+	+	2	+	+	+	+	+	+	V
Crataegus monogyna	+	+	+	+	-	+	1	+	-	+	IV
Cruciata glabra	-	-	+	-	-	-	-	-	-	+	I
Digitalis lanata	+	-	-	-	+	-	-	-	-	+	II
Ligustrum vulgare	-	+	+	-	-	-	-	+	-	-	II
Nectaroscordum siculum ssp. bulgaricum	-	-	-	-	-	-	-	+	-	-	I
Orchis purpurea	-	-	+	-	-	-	-	-	-	-	I
Pulmonaria mollis ssp. mollissima	-	+	+	-	-	+	+	-	-	+	III
Sorbus torminalis	-	-	+	-	-	-	+	-	-	+	II
Teucrium chamaedrys	+	+	+	-	1	-	-	-	-	-	II
Tilia tomentosa	-	+	-	-	+	-	-	+	-	+	II
Vinca herbacea	1	-	-	-	-	+	+	-	-	-	II
Viola hirta	+	-	+	-	-	-	+	-	-	-	II
Viola suavis	-	+	+	+	+	+	+	-	-	-	III
Querco fagetea s.l.											
Acer platanoides	-	+	+	-	-	-	-	-	-	-	I
Anemone ranunculoides	-	-	-	+	-	-	-	-	+	-	I
Corydalis cava	-	-	-	+	-	+	-	-	+	-	II
Corydalis solida	-	-	-	+	-	+	-	-	+	-	II
Dactylis polygama	-	+	+	-	-	-	-	+	-	+	II
Fragaria vesca	-	-	-	-	-	+	-	+	-	+	II
Fraxinus excelsior juv.	-	-	+	-	-	-	-	+	+	-	II
Galium schultesii	-	-	-	-	-	-	+	-	-	-	I
Geranium robertianum	-	+	+	-	-	+	+	+	+	-	III
Glechoma hirsuta	-	-	-	-	-	+	-	+	+	+	II
Geum urbanum	-	1	+	+	+	+	+	+	+	+	V
Hedera helix	-	-	-	-	-	-	-	+	-	+	I
Millium effusum	-	+	-	-	-	-	-	+	-	-	I
Ranunculus ficaria ssp. calthifolius	-	-	-	+	-	-	-	-	-	-	I
Scilla bifolia	-	-	-	+	-	-	-	+	+	-	II
Stachys sylvatica	+	-	-	-	-	-	-	-	-	-	I
Ulmus procera	-	-	+	-	-	-	-	-	-	-	I
Viola reichenbachiana	+	+	+	+	-	+	+	+	+	-	IV
Viola odorata	-	-	-	+	-	-	-	+	-	2	II
Festuco brometea s.l.											
Agropyron cristatum ssp. pectinatum	1	-	-	-	+	-	-	-	-	-	I
Achillea setacea	-	-	-	-	-	+	+	-	-	+	II

Table 1 (continued)

Artemisia austriaca	-	-	-	-	-	-	-	-	+	-	I
Asperula cynanchica	-	-	-	-	+	-	-	-	-	-	I
Chondrilla juncea	-	-	-	-	+	-	-	-	-	-	I
Crepis foetida ssp. rhoeadifolia	-	-	-	-	+	-	-	-	-	-	I
Eryngium campestre	-	+	-	-	-	-	-	-	-	-	I
Festuca valesiaca	-	-	-	-	3	-	+	+	-	-	II
Galium verum	-	-	-	-	+	-	-	-	-	-	I
Hyacinthella leucophaea	-	-	-	-	-	+	-	-	-	-	I
Melica ciliata	-	-	-	-	+	-	-	-	-	-	I
Muscari racemosum	-	+	-	-	-	-	-	-	-	-	I
Orlaya grandiflora	-	-	-	-	-	-	+	-	-	-	I
Poa bulbosa	-	-	-	-	-	-	-	+	-	-	I
Poa angustifolia	1	-	-	-	-	-	+	-	-	-	I
Taraxacum serotinum	+	-	-	-	+	-	+	-	-	-	II
Thymus pannonicus ssp. auctus	+	-	-	-	-	-	-	-	-	-	I
Verbascum phlomoides	+	-	-	-	-	-	-	-	-	-	I
Variae syntaxa											
Alliaria petiolata	-	+	-	-	-	-	-	-	-	-	I
Althaea officinalis	-	-	-	-	-	-	+	-	-	-	I
Anthriscus cerefolium ssp. trichosperma	-	-	-	-	-	-	+	-	-	-	I
Cardaria draba	-	-	-	-	-	-	+	-	+	-	I
Capsella bursa-pastoris	+	-	-	-	-	-	+	-	-	-	I
Carduus crispus	-	-	-	-	-	-	-	-	-	+	I
Chaerophyllum bulbosum	-	-	-	-	-	-	-	-	+	-	I
Chaerophyllum temulum	-	-	+	-	-	-	+	+	-	-	II
Chenopodium album	-	-	-	-	-	-	-	+	+	+	II
Cichorium intybus	-	-	-	+	-	-	-	-	-	-	I
Convolvulus arvensis	-	-	-	-	-	+	+	-	-	+	II
Cynanchum acutum	-	-	+	+	-	+	+	+	+	+	IV
Fragaria viridis	2	-	-	+	-	+	+	-	+	-	III
Galium aparine	1	-	-	+	-	-	-	-	-	-	I
Lamium amplexicaule	-	-	-	-	-	-	+	-	-	-	I
Lamium maculatum	-	-	-	+	-	-	-	-	-	-	I
Lamium purpureum	+	-	-	+	-	-	+	+	+	-	III
Leonurus cardiaca	-	-	-	+	-	-	-	-	-	-	I
Lepidium ruderale	-	-	-	-	-	-	-	+	-	-	I
Lotus corniculatus	+	-	-	-	-	-	-	-	-	-	I
Marrubiumm vulgare	-	-	+	-	-	+	-	+	+	+	III

Table 1 (continued)

Myosotis arvensis	+	-	-	-	-	-	-	-	-	-	I
Stellaria media	+	-	-	-	-	-	-	-	-	-	I
Taraxacum officinale	+	-	-	+	-	-	+	+	+	-	III
Thalictrum minus	-	-	+	-	-	-	-	-	-	-	I
Urtica dioica	-	-	-	+	-	+	-	-	-	-	I
Valerianella locusta	+	-	-	-	-	-	-	-	-	-	I
Veronica hederifolia	-	-	-	-	-	-	-	-	+	-	I
Vicia hirsuta	+	-	-	-	-	-	-	-	-	-	I

Sites and dates

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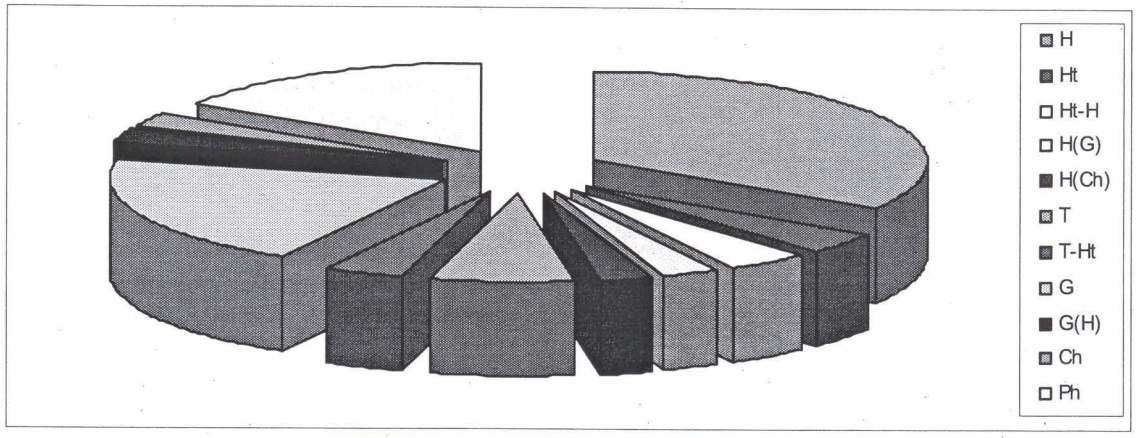

Fig. 1. The spectrum of the bioforms.

H – hemicryptophytes, Ht – hemitherophytes, T – therophytes, G – geophytes, Ph – phanerophytes, Ch – chamephyte.

The pattern of ecological parameters (Fig. 3) points to the fact that taking into consideration light preferences, the heliofile species which do not bear shading too well, are the most numerous, followed by the species from the intermediate level (L = 6) of semi-shading. With respect to heat preferences, the most numerous are the plants widespread in temperate and warm areas. Taking into consideration soil humidity, the majority is held by mesophile species and by those developing on moderately wet soils.

The association includes some floral elements with rather high protective value. We mention *Paeonia peregrina, Galanthus plicatus*, *Myrrhoides nodosa* and *Hyacinthella leucophaea.*

Euras. – Euro-Asian, Eur – European, Euc – Central European, Circ – Circumpolar, Smd – Sub-Mediterranean, Cosm – ubiquist, Pont – pontique, Medit – Mediterranean, Balc – balcanic, Atl. medit – atlantique Mediterranean.

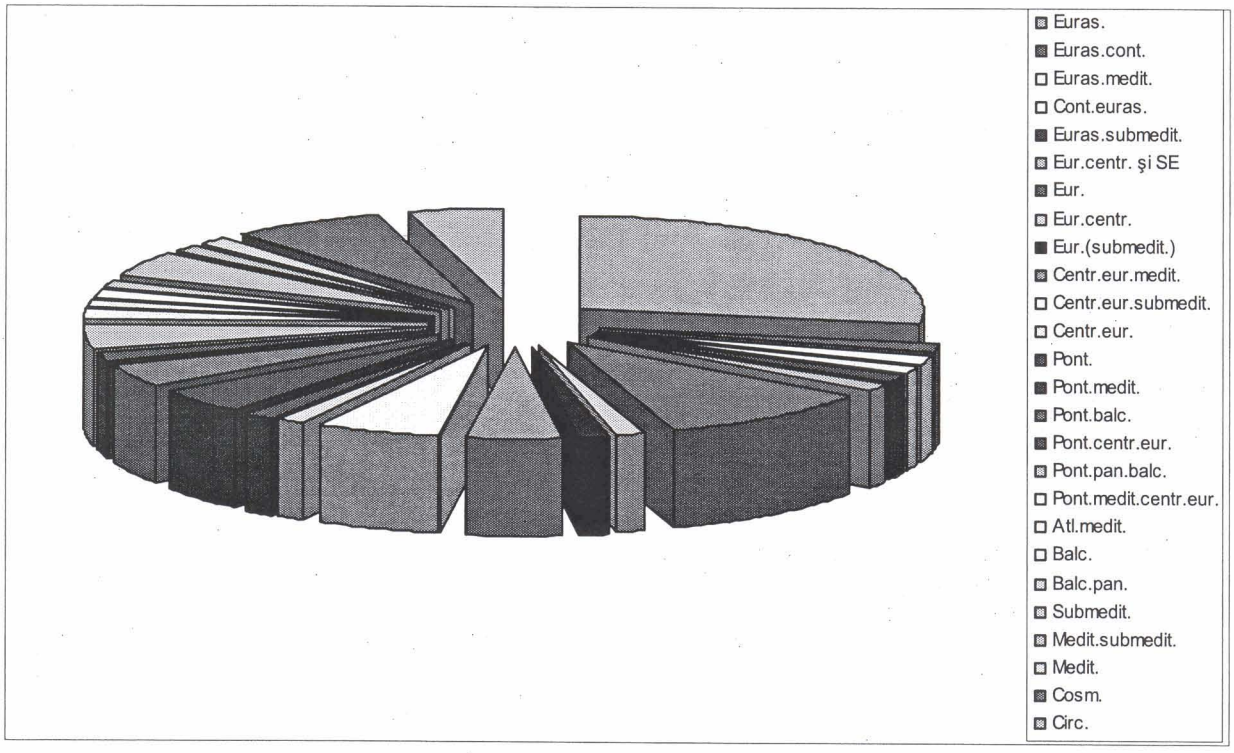

Fig. 2. The spectrum of the geographic elements.

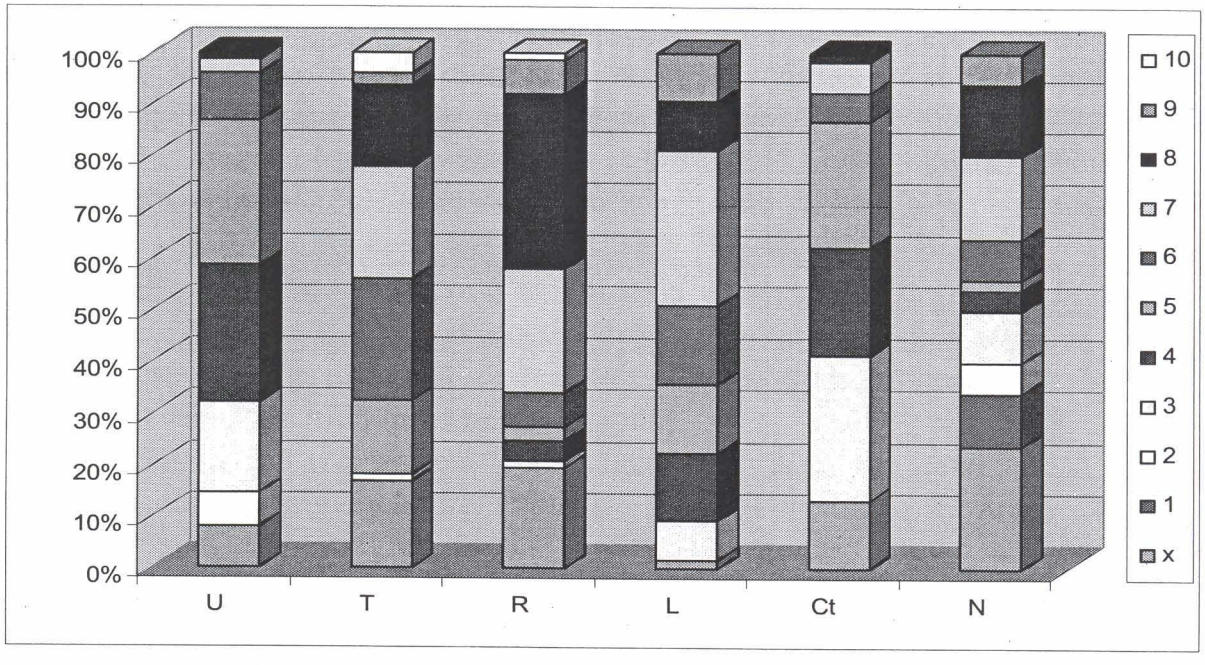

Fig. 3. The spectrum of the ecological indexes.

U – humidity, T – temperature, R – pH, L – light, Ct – continentality, N – soil trophicity, based on nitrogen contents.

CONCLUSIONS

The *Paeonio peregrinae – Carpinetum orientalis Doniţă 1970* association, relatively rare in Dobrogea, is widespread on Tulcea Hills. Phytocenoses identified by *Carpinus orientalis* have a rich and varied floral composition and resemble the ones described in Dobrogea, concerning the floral and phytocenological composition, the spatial structure and the composition of the bioforms spectra, floral elements and ecological markers.

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