

FLORISTIC CHARACTERISTICS OF PASTURES ON FAMILY FARMS IN ISTRIA

IVANA VITASOVIĆ KOSIĆ & MIHAELA BRITVEC

Faculty of Agriculture, University of Zagreb, Department
of Agricultural Botany, Svetošimunska 25, 10000 Zagreb, Croatia

Vitasović Kosić, I. & M. Britvec: Floristic characteristics of pastures on family farms in Istria, *Nat. Croat.*, Vol. 14, No. 4., 273–287, 2005, Zagreb.

Vascular pasture flora was investigated at a localities of 6 family-owned farms that raise sheep, situated from south to north of the Istrian Peninsula, Croatia. During the research in 2003, a total of 291 plant taxa (268 species and 23 subspecies) were found. The taxa belonged to 182 genera and 44 families. The most dominant families are: *Compositae* (14.78%) and *Gramineae* (14.78%), followed by *Leguminosae* (11.34%) and *Labiatae* (9.97%). According to analysis of life forms, the most numerous are *Hemicryptophyta* (49.83%) and *Therophyta* (27.15%).

Key words: flora, pasture, family farm, Istria, Croatia

Vitasović Kosić, I. & M. Britvec: Florističke značajke pašnjaka na obiteljskim poljoprivrednim gospodarstvima u Istri, *Nat. Croat.*, Vol. 14, No. 4., 273–287, 2005, Zagreb.

Vaskularna flora pašnjaka istraživana je na lokalitetima 6 obiteljskih gospodarstva koja imaju ovčarsku proizvodnju i smještena su od juga do sjevera istarskog poluotoka. Tijekom istraživanja 2003. godine ustanovljena je 291 biljna vrsta (268 vrsta i 23 podvrste) u okviru 182 roda i 44 porodice. Većina je biljaka pripadala skupinama *Compositae* (14.78%) i *Gramineae* (14.78%), slijedile su *Leguminosae* (11.34%) i *Labiatae* (9.97%). U spektru životnih oblika prevladavali su hemikriptofiti (49.83%) i terofiti (27.15%).

Ključne riječi: flora, pašnjak, obiteljsko poljoprivredno gospodarstvo, Istra, Hrvatska

INTRODUCTION

Grasslands (meadows and pastures) are habitats that have an essential impact on plant and landscape diversity in Croatia. In spite of many investigations into flora in Croatia recent references to grassland flora in Istria are relatively sparse (ALEGRO, 2003; ČARNI, 1996; HORVAT, 1962; HORVATIĆ, 1963; ILJANIĆ, 1967; KALIGARIĆ & POLDINI, 1997; PERICIN, 2001; STARMÜHLER, 1998; 1999; 2000; 2001; 2002; 2003; 2003a; ŠEGULJA, 1969; ŠUGAR, 1984; 1992; TOPIĆ & ŠEGULJA, 2000; TRINAJSTIĆ, 1999). In fact references to grassland flora specifically related to family-owned farms in

Istria do not exist. Therefore the aim of this study is to contribute to the preservation of pasture plant diversity, via an investigation into the pasture flora on family-owned farms in Istria.

MATERIAL AND METHODS

Investigation of Istrian pasture flora within »The preservation of pasture plant diversity in the Adriatic region« project (supported by the Ministry of Science, Education and Sports of the Republic of Croatia) has been underway since 2003 in family-owned farms that raise sheep. The research localities are situated from the south to the north of the Istrian Peninsula, Croatia (Fig. 1).

In 2003, research into the pasture flora in Istria included field work (from April to October) and the analysis of herbarium specimens. Vascular pasture flora was investigated at the locality of the following family-owned sheep-raising farms (Fig. 1): Slum (Zlatić family), Gregurinčiči (Staraj family), Boljanski Katun (Rogović family), Trošti (Pulić family), Krnica (Percan family), St. Grgur (Macan family). The family farms researched varied in size from 2 to 20 ha: the farm near Slum covers an area of about 10 ha, near Gregurinčiči about 4 ha, near Boljanski Katun about 7 ha, near Trošti about 2 ha, near Krnica about 20 ha, near St. Grgur about 13 ha.

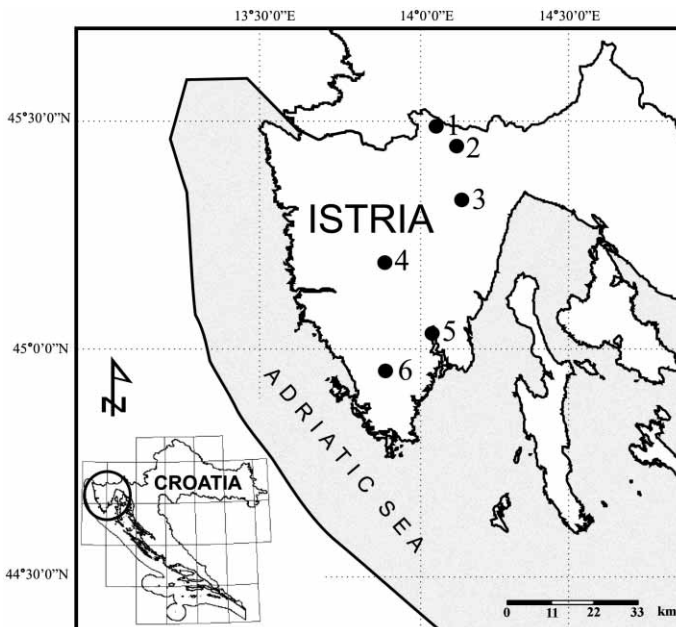


Fig. 1. Area of investigation; the Istrian Peninsula with localities of the family farms: 1 – Slum (Zlatić family), 2 – Gregurinčiči (Staraj family), 3 – Boljanski Katun (Rogović family), 4 – Trošti (Pulić family), 5 – Krnica (Percan family), 6 – St. Grgur (Macan family)

Tab. 1. Floristic list

Life forms	Localities of the family farms
ANGIOSPERMAE	
DICOTYLEDONES	
AMARANTHACEAE	
T	<i>Amaranthus retroflexus</i> L. 2, 3
BORAGINACEAE	
T	<i>Myosotis arvensis</i> (L.) Hill 2, 3, 4
T	<i>Myosotis ramosissima</i> Rochel 2, 5
CAMPANULACEAE	
H	<i>Campanula thyrsoidea</i> L. 2
H	<i>Campanula trachelium</i> L. 2
T	<i>Legousia speculum-veneris</i> (L.) Chaix 1, 2, 3, 5
CARYOPHYLLACEAE	
T	<i>Agrostemma githago</i> L. 2
Ch	<i>Cerastium tomentosum</i> L. 3, 4, 5, 6
H	<i>Dianthus carthusianorum</i> L. 5
H	<i>Dianthus ferrugineus</i> Miller subsp. <i>liburnicus</i> (Bartl.) Tutin 1, 2, 3, 5
H	<i>Dianthus sylvestris</i> Wulfen in Jacq. subsp. <i>tergestinus</i> (Reichenb.) Hayek 1, 5, 6
Ch	<i>Minuartia verna</i> (L.) Hiern subsp. <i>collina</i> (Neilr.) Domin 3
T	<i>Petrorhagia prolifera</i> (L.) P. W. Ball & Heywood 3
H	<i>Petrorhagia saxifraga</i> (L.) Link 4, 5, 6
H	<i>Silene dioica</i> (L.) Clairv. 1, 2
H	<i>Silene latifolia</i> Poirlet subsp. <i>alba</i> (Miller) Greuter & Burdet 2, 5
H	<i>Silene vulgaris</i> (Moench) Garcke 1, 2, 3
H	<i>Silene vulgaris</i> (Moench) Garcke subsp. <i>angustifolia</i> Hayek 5
T	<i>Stellaria media</i> (L.) Vill. 2, 3, 5, 6
CHENOPODIACEAE	
T	<i>Chenopodium album</i> L. 2, 3, 5
T	<i>Chenopodium hybridum</i> L. 5
T	<i>Chenopodium rubrum</i> L. 3
CISTACEAE	
Ch	<i>Fumana ericoides</i> (Cav.) Gand. 1, 6
Ch	<i>Fumana procumbens</i> (Dunal) Gren. & Godron 1, 2, 5
Ch	<i>Helianthemum nummularium</i> (L.) Miller 1, 3, 5, 6
COMPOSITAE	
H	<i>Achillea millefolium</i> L. 1, 2, 3, 4, 5, 6
T	<i>Anthemis arvensis</i> L. 3, 4, 5, 6
H	<i>Aposeris foetida</i> (L.) Less. 2, 6
H	<i>Balsamita major</i> Desf. 1
H	<i>Bellis perennis</i> L. 2, 3, 5, 6

Life forms		Localities of the family farms
H	<i>Carduus micropterus</i> (Borbás) Teyber	3
H	<i>Carduus nutans</i> L.	1
H	<i>Carduus pycnocephalus</i> L.	4, 5, 6
H	<i>Carlina corymbosa</i> L.	1, 5, 6
T	<i>Centaurea cyanus</i> L.	5, 6
H	<i>Centaurea jacea</i> L.	2, 3, 4, 5
H	<i>Centaurea spinosociliata</i> Seenus subsp. <i>tommasinii</i> (A. Kerner) Dostál	1, 5
H	<i>Centaurea triumphetti</i> All.	1
T	<i>Chamomilla recutita</i> (L.) Rauschert	3, 5
H	<i>Chondrilla juncea</i> L.	5
H	<i>Cichorium intybus</i> L.	1, 2, 3, 5
G	<i>Cirsium arvense</i> (L.) Scop.	3, 5, 6
T	<i>Conyza canadensis</i> (L.) Cronq.	2, 3
H	<i>Crepis biennis</i> L.	4, 5
T	<i>Crepis capillaris</i> (L.) Wallr.	5
T	<i>Crepis neglecta</i> L.	5, 6
H	<i>Crepis sancta</i> (L.) Babcock	1, 2, 5
T	<i>Erigeron annuus</i> (L.) Pers.	2, 5
T	<i>Filaginella uliginosa</i> (L.) Opiz	5, 6
T	<i>Filago pyramidata</i> L.	5, 6
H	<i>Hieracium pilosella</i> L.	1, 6
H	<i>Gimula hirta</i> L.	1, 2
H	<i>Inula spiraeifolia</i> L.	5
H	<i>Jurinea mollis</i> (L.) Reichenb.	1
H	<i>Leontodon crispus</i> Vill.	1, 6
H	<i>Leucanthemum vulgare</i> Lam.	2, 5
H	<i>Picris hieracioides</i> L.	1
Ch	<i>Reichardia picroides</i> (L.) Roth	5, 6
H	<i>Scolymus hispanica</i> L.	5, 6
H	<i>Scorzonera hispanica</i> L.	1
H	<i>Scorzonera villosa</i> Scop.	1, 2, 4, 5, 6
Ch	<i>Senecio abrotanifolius</i> L.	1
H	<i>Sonchus arvensis</i> L.	5
T	<i>Sonchus oleraceus</i> L.	2
H	<i>Taraxacum officinale</i> Weber	1, 2, 3, 4, 5, 6
H	<i>Tragopogon porrifolius</i> L.	5
H	<i>Tragopogon pratensis</i> L.	2
H	<i>Tragopogon pratensis</i> L. subsp. <i>orientalis</i> (L.) Čelak.	5
CONVOLVULACEAE		
H	<i>Convolvulus althaeoides</i> L. subsp. <i>tenuissimus</i> (Sibth. & Sm.) Stace	5, 6
G	<i>Convolvulus arvensis</i> L.	2, 4, 5, 6

Life forms		Localities of the family farms
G	<i>Convolvulus cantabrica</i> L. CRASSULACEAE	3
Ch	<i>Sedum acre</i> L. CRUCIFERAE	2, 3, 4, 5, 6
T	<i>Arabidopsis thaliana</i> (L.) Heynh.	2, 5
Ch	<i>Brassica oleracea</i> L.	2, 5
T	<i>Camelina sativa</i> (L.) Crantz	5
T	<i>Capsella bursa-pastoris</i> (L.) Medicus	2, 3, 4, 5, 6
H	<i>Cardamine hirsuta</i> L.	6
H	<i>Cardaria draba</i> (L.) Desv.	5
H	<i>Rorippa austriaca</i> (Crantz) Besser	5
T	<i>Sisymbrium officinale</i> (L.) Scop.	3, 5
T	<i>Thlaspi arvense</i> L.	3, 5
H	<i>Thlaspi praecox</i> Wulfen DIPSACACEAE	1, 3, 4
H	<i>Knautia arvensis</i> (L.) Coulter	1, 2, 3, 4, 5
H	<i>Knautia purpurea</i> (Vill.) Borbás	6
H	<i>Scabiosa columbaria</i> L. ERICACEAE	2, 5
Ch	<i>Calluna vulgaris</i> (L.) Hull EUPHORBIACEAE	6
Ch	<i>Euphorbia amygdaloides</i> L.	2, 5
H	<i>Euphorbia cyparissias</i> L.	1, 2, 3, 5, 6
H	<i>Euphorbia esula</i> L.	1
T	<i>Euphorbia helioscopia</i> L.	5
Ch	<i>Euphorbia nicaeensis</i> All. GERANIACEAE	1, 3, 4, 5, 6
T	<i>Erodium cicutarium</i> (L.) L'Hér.	5
T	<i>Geranium molle</i> L.	6
H/G	<i>Geranium phaeum</i> L.	2
T	<i>Geranium purpureum</i> Vill.	2, 3, 5, 6
H	<i>Geranium robertianum</i> L. GENTIANACEAE	2, 3, 4, 5, 6
H	<i>Centaurium erythraea</i> Rafn subsp. <i>erythraea</i> GLOBULARIACEAE	6
Ch	<i>Globularia cordifolia</i> L. GUTTIFERAE	1, 3
H	<i>Hypericum perforatum</i> L. LABIATAE	1, 5, 6
H	<i>Ajuga reptans</i> L.	2, 3
H	<i>Ballota nigra</i> L.	6

Life forms		Localities of the family farms
H	<i>Calamintha nepeta</i> (L.) Savi	3, 5, 6
H	<i>Calamintha sylvatica</i> Bromf. subsp. <i>ascendens</i> (Jordan) P. W. Ball	2, 3, 5
H	<i>Clinopodium vulgare</i> L.	3, 5
T	<i>Glechoma hederacea</i> L.	1, 2
H	<i>Glechoma hirsuta</i> Waldst. & Kit.	2
H	<i>Lamium maculatum</i> L.	2
T	<i>Lamium purpureum</i> L.	3, 4, 5
H	<i>Marrubium incanum</i> Desr.	1, 3, 5, 6
H	<i>Melissa officinalis</i> L.	5
H	<i>Melittis melissophyllum</i> L.	5
H	<i>Mentha arvensis</i> L.	1, 2, 4, 5
H	<i>Mentha longifolium</i> (L.) Hudson	5
H	<i>Mentha pulegium</i> L.	3, 5
H	<i>Prunella laciniata</i> (L.) L.	3, 4, 5, 6
H	<i>Prunella vulgaris</i> L.	2
Ch	<i>Salvia officinalis</i> L.	2, 3
Ch	<i>Salvia pratensis</i> L.	1, 2, 4, 5, 6
Ch	<i>Satureja montana</i> L. subsp. <i>illyrica</i> Nyman	1, 3
Ch	<i>Satureja montana</i> L. subsp. <i>variegata</i> (Host) P. W. Ball	1
T	<i>Stachys annua</i> (L.) L.	5
H	<i>Stachys officinalis</i> (L.) Trevisan	1, 2
H	<i>Stachys recta</i> L. subsp. <i>subcrenata</i> (Vis.) Briq.	1, 5, 6
Ch	<i>Teucrium chamaedrys</i> L.	1, 3, 5
Ch	<i>Teucrium montanum</i> L.	1, 6
Ch	<i>Teucrium polium</i> L.	5, 6
Ch	<i>Thymus serpyllum</i> L.	1, 2, 3, 4, 5, 6
Ch	<i>Thymus vulgaris</i> L.	3
	LEGUMINOSAE	
H	<i>Anthyllis vulneraria</i> L.	1, 2, 5, 6
H	<i>Anthyllis vulneraria</i> L. subsp. <i>praepropera</i> L. (A. Kerner) Bornm.	3, 6
H	<i>Coronilla cretica</i> L.	5
Ch	<i>Dorycnium hirsutum</i> (L.) Ser.	6
Ch	<i>Dorycnium pentaphyllum</i> Scop. subsp. <i>germanicum</i> (Gremli) Gams	1, 5
Ch	<i>Dorycnium pentaphyllum</i> Scop. subsp. <i>herbaceum</i> (Vill.) Rouy	1, 6
P	<i>Genista tinctoria</i> L.	1, 3, 6
Ch	<i>Hippocrepis comosa</i> L.	2
T	<i>Lathyrus aphaca</i> L.	2
T	<i>Lathyrus cicera</i> L.	5, 6
H	<i>Lathyrus latifolius</i> L.	2, 5, 6
H	<i>Lathyrus pratensis</i> L.	2
G	<i>Lathyrus tuberosus</i> L.	3, 5

Life forms		Localities of the family farms
T	<i>Lotus corniculatus</i> L.	1, 2, 3, 4, 5, 6
T	<i>Medicago arabica</i> (L.) Hudson	5
T	<i>Medicago lupulina</i> L.	1, 2, 4, 6
T	<i>Medicago minima</i> (L.) Bartal.	3, 5, 6
T	<i>Medicago orbicularis</i> (L.) Bartal.	5, 6
H	<i>Medicago sativa</i> L.	2, 6
T	<i>Melilotus indica</i> (L.) All.	4
Ch	<i>Ononis spinosa</i> L.	2, 4
T	<i>Scorpiurus muricatus</i> L.	5, 6
T	<i>Trifolium angustifolium</i> L.	5, 6
T	<i>Trifolium campestre</i> Schreber	1, 2, 3, 4, 5, 6
T	<i>Trifolium dubium</i> Sibth.	2, 3
H	<i>Trifolium montanum</i> L.	1, 2, 6
H	<i>Trifolium ochroleucon</i> Hudson	5
H	<i>Trifolium pratense</i> L.	2, 3, 4, 5
T	<i>Trifolium repens</i> L.	2, 3, 4, 5, 6
T	<i>Trifolium stellatum</i> L.	2, 4, 5, 6
H	<i>Vicia cracca</i> L.	2, 3, 6
H	<i>Vicia sepium</i> L.	5
T	<i>Vicia villosa</i> Roth subsp. <i>varia</i> (Host) Corb.	2
	LINACEAE	
T	<i>Linum tenuifolium</i> L.	1, 5
	MALVACEAE	
H	<i>Malva sylvestris</i> L.	3, 4, 5
	PAPAVERACEAE	
G	<i>Corydalis cava</i> (L.) Schweigger & Koerte	2
T	<i>Papaver argemone</i> L.	3, 5, 6
T	<i>Papaver rhoeas</i> L.	1, 3, 5, 6
	PLANTAGINACEAE	
H	<i>Plantago holosteum</i> Scop.	1, 2, 4, 6
H	<i>Plantago lanceolata</i> L.	1, 2, 3, 4, 5, 6
H	<i>Plantago major</i> L.	1, 2, 3, 4, 5, 6
H	<i>Plantago media</i> L.	2
	POLYGALACEAE	
H	<i>Polygala nicaeensis</i> Risso ex Koch	2, 5
H	<i>Polygala vulgaris</i> L.	1, 2, 3, 4, 6
	POLYGONACEAE	
T	<i>Polygonum aviculare</i> L.	2, 3
H	<i>Rumex acetosa</i> L.	5, 6
H	<i>Rumex acetosella</i> L.	5
H	<i>Rumex crispus</i> L.	1, 2, 3, 5

Life forms		Localities of the family farms
H	<i>Rumex pulcher</i> L. PORTULACACEAE	5, 6
T	<i>Portulaca oleracea</i> L. PRIMULACEAE	3, 5
T	<i>Anagallis arvensis</i> L.	1, 4
G	<i>Cyclamen hederifolium</i> Aiton	3
G	<i>Cyclamen repandum</i> Sibth. & Sm. RANUNCULACEAE	3
T	<i>Adonis aestivalis</i> L.	2
P	<i>Clematis vitalba</i> L.	2
T	<i>Consolida regalis</i> S. F. Gray	4
G	<i>Helleborus multifidus</i> Vis. subsp. <i>istriacus</i> (Schiffner) Merxm. & Podl.	1, 2, 3, 4
H	<i>Ranunculus acris</i> L.	1, 2, 3, 4, 5, 6
G	<i>Ranunculus ficaria</i> L.	2, 3, 5, 6
H	<i>Ranunculus lanuginosus</i> L.	4, 5, 6
H	<i>Thalictrum minus</i> L. RESEDACEAE	1
H	<i>Reseda lutea</i> L. ROSACEAE	3, 4, 5
H	<i>Filipendula vulgaris</i> Moench	1, 2, 3, 4, 5, 6
H	<i>Fragaria vesca</i> L.	1, 4, 6
H	<i>Potentilla alba</i> L.	1
H	<i>Potentilla cinerea</i> Chaix ex Vill.	6
H	<i>Potentilla micrantha</i> Ramond ex DC.	1
H	<i>Potentilla reptans</i> L.	1, 3, 4, 6
P	<i>Rosa canina</i> L.	3
P	<i>Rubus caesius</i> L.	3, 4, 5
H	<i>Sanguisorba minor</i> Scop. RUBIACEAE	1, 2, 3, 4, 5, 6
H	<i>Asperula cynanchica</i> L.	1, 5
T	<i>Galium aparine</i> L.	5
H	<i>Galium corrudifolium</i> Vill.	1
H	<i>Galium lucidum</i> All.	1, 2
H	<i>Galium mollugo</i> L.	1, 2, 3, 4, 5, 6
H	<i>Galium verum</i> L. RUTACEAE	1, 2
Ch	<i>Ruta graveolens</i> L. SCROPHULARIACEAE	1
G	<i>Lathraea squamaria</i> L.	2
G	<i>Linaria vulgaris</i> Miller	2
T	<i>Melampyrum pratense</i> L.	3

Life forms		Localities of the family farms
T	<i>Rhinanthus alectorolophus</i> (Scop.) Pollich	2, 4, 5
H	<i>Scrophularia heterophylla</i> Willd. subsp. <i>laciniata</i> (Waldst. & Kit.) Maire & Petinmegin	5, 6
H	<i>Verbascum densiflorum</i> Bertol.	2, 5
Ch	<i>Veronica chamaedrys</i> L.	2, 3
H	<i>Veronica spicata</i> L.	1
H	<i>Veronica spicata</i> L. subsp. <i>barrelieri</i> (Schott ex Roemer & Schultes) Murb.	4
SOLANACEAE		
T	<i>Solanum luteum</i> Miller	2
T	<i>Solanum nigrum</i> L.	1, 3
UMBELLIFERAE		
T	<i>Bupleurum baldense</i> Turra subsp. <i>baldense</i>	3, 5
H	<i>Daucus carota</i> L.	1, 2, 3, 4, 5
H	<i>Eryngium amethystinum</i> L.	1, 5
H	<i>Eryngium campestre</i> L.	6
H	<i>Foeniculum vulgare</i> Miller	4, 5
T	<i>Orlaya grandiflora</i> (L.) Hoffm.	5, 6
H	<i>Seseli tortuosum</i> L.	3
T	<i>Tordylium apulum</i> L.	5, 6
URTICACEAE		
H	<i>Urtica dioica</i> L.	4
VERBENACEAE		
H	<i>Verbena officinalis</i> L.	2, 5
VIOLACEAE		
H	<i>Viola reichenbachiana</i> Jordan ex Boreau	1, 2, 3, 4, 6
H	<i>Viola tricolor</i> L.	4, 6
MONOCOTYLEDONES		
ARACEAE		
G	<i>Arum italicum</i> Miller	2
G	<i>Arum maculatum</i> L.	2
CYPERACEAE		
G	<i>Carex caryophyllea</i> Latourr.	1, 2
H	<i>Carex humilis</i> Leysser	1
GRAMINEAE		
T	<i>Aegilops neglecta</i> Req. ex Bertol.	3, 5, 6
T	<i>Aegilops triuncialis</i> L.	5
G	<i>Agrostis stolonifera</i> L.	5
T	<i>Aira elegantissima</i> Schur	3, 5, 6
H	<i>Anthoxanthum odoratum</i> L.	2, 4, 5, 6
H	<i>Arrhenatherum elatius</i> (L.) Beauv. ex J. & C. Presl	1, 2, 3, 5

Life forms		Localities of the family farms
T	<i>Avena fatua</i> L.	5
T	<i>Avena sativa</i> L.	5
T	<i>Avena sterilis</i> L.	5
H	<i>Brachypodium pinnatum</i> (L.) Beauv.	1
H	<i>Brachypodium sylvaticum</i> (Hudson) Beauv.	5, 6
T	<i>Briza maxima</i> L.	5, 6
H	<i>Briza media</i> L.	2, 5, 6
H	<i>Bromus erectus</i> Hudson	1, 2, 3, 4, 5, 6
H	<i>Bromus inermis</i> Leysser	3, 5, 6
T	<i>Bromus madritensis</i> L.	5, 6
T	<i>Bromus sterilis</i> L.	3, 5
H	<i>Calamagrostis varia</i> (Schrader) Host	1
H	<i>Chrysopogon gryllus</i> (L.) Trin.	1, 5, 6
H	<i>Cynodon dactylon</i> (L.) Pers.	2, 3, 6
T	<i>Cynosurus echinatus</i> L.	5
H	<i>Dactylis glomerata</i> L.	1, 2, 4, 5, 6
H	<i>Dactylis glomerata</i> L. subsp. <i>hispanica</i> (Roth) Nyman	5
H	<i>Dasypyrum villosum</i> (L.) P. Candargy	5, 6
G	<i>Elymus repens</i> (L.) Gould	2, 5, 6
H	<i>Festuca lemanii</i> Bast.	6
H	<i>Festuca ovina</i> L.	1, 3, 5, 6
H	<i>Festuca pseudovina</i> Hackel ex Wiesb.	6
H	<i>Holcus lanatus</i> L.	5, 6
T	<i>Hordeum bulbosum</i> L.	5, 6
T	<i>Hordeum murinum</i> L.	5
H	<i>Koeleria splendens</i> C. Presl	1, 5, 6
T	<i>Lagurus ovatus</i> L.	4
T/H	<i>Lolium multiflorum</i> Lam.	1, 2, 3, 4, 5
H	<i>Lolium perenne</i> L.	2, 3, 5, 6
G	<i>Melica uniflora</i> Retz.	1, 3
H	<i>Nardus stricta</i> L.	1
H	<i>Phleum pratense</i> L.	5
T	<i>Poa pratensis</i> L.	2, 4, 5, 6
T	<i>Setaria viridis</i> (L.) Beauv.	2, 3, 5
H	<i>Stipa pennata</i> L.	1
H	<i>Trisetum flavescens</i> (L.) Beauv.	4
T	<i>Vulpia myuros</i> (L.) C. C. Gmelin	5, 6
IRIDACEAE		
G	<i>Crocus biflorus</i> Miller	3, 6
G	<i>Crocus imperati</i> Ten.	1

Life forms		Localities of the family farms
	LILIACEAE	
G	<i>Allium ampeloprasum</i> L.	5
G	<i>Allium saxatile</i> Bieb.	1
G	<i>Asparagus tenuifolius</i> Lam.	1, 3, 5, 6
G	<i>Colchicum autumnale</i> L.	6
G	<i>Muscari botryoides</i> (L.) Miller	1, 4, 5
G	<i>Muscari comosum</i> (L.) Miller	2, 5, 6
G	<i>Narcissus poeticus</i> L. subsp. <i>radiiflorus</i> (Salisb.) Baker	1, 2
G	<i>Ornithogalum pyramidale</i> L.	5, 6
P	<i>Ruscus aculeatus</i> L.	3, 6
G	<i>Scilla bifolia</i> L.	3
	ORCHIDACEAE	
G	<i>Orchis morio</i> L.	1, 3, 6
G	<i>Platanthera bifolia</i> (L.) L. C. M. Richard	2
G	<i>Spiranthes spiralis</i> (L.) Chevall.	6

The plants were determined by standard flora keys (PIGNATTI, 2002; TUTIN *et al.*, 2002). The nomenclature has been adjusted according to TUTIN *et al.* (2002). The analysis of life forms has been made according to PIGNATTI (2002). In the flora list they are marked with the abbreviations of life forms preceding the names of taxa: Ch – Chamaephyta, G – Geophyta, H – Hemicryptophyta, H/G – transition form between Hemicryptophyta and Geophyta, P – Phanerophyta, T – Therophyta, T/H – transition form between Therophyta and Hemicryptophyta. The localities of the family farms (marked with number) are given after the names of the taxa (1 – Slum, 2 – Gregurinčići, 3 – Boljunki Katun, 4 – Trošti, 5 – Krnica, 6 – St. Grgur). In the list of flora, the taxa are presented in alphabetical order of families, genera, species and subspecies.

RESULTS AND DISCUSSION

On Istrian family farms, a total of 291 species and subspecies of vascular pasture flora were found (Tab. 1). The results of the taxonomic and ecological analysis are presented in Tabs. 2 and 3 and Fig. 2.

According to the floristic list, the dominant group is *Dicotyledones* (*Magnoliatae*) with 229 species and subspecies (78.69%), followed by *Monocotyledones* (*Liliatae*) with 62 species and subspecies (21.31%). The pasture flora that has been explored includes 44 families, 182 genera, 268 species and 23 subspecies (Tab. 1). The most numerous families are: *Compositae* with 41 species and 2 subspecies (14.78%) and *Gramineae* with 42 species and 1 subspecies (14.78%), followed by *Leguminosae* with 29 species and 4 subspecies (11.34%) and *Labiatae* with 25 species and 4 subspecies (9.97%). Other families are represented with a smaller number of taxa. The signifi-

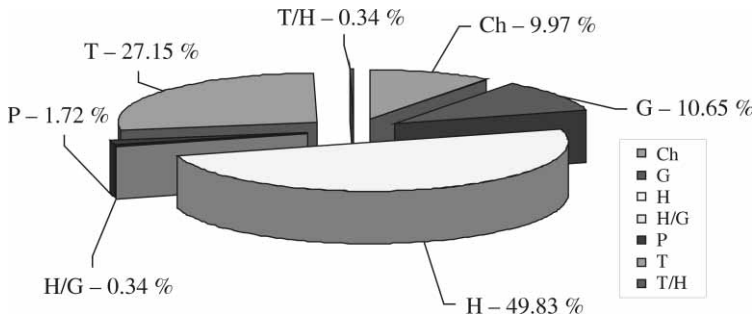


Fig. 2. Spectrum of life forms of the pasture flora from the family farms in Istria (Ch – Chamaephyta, G – Geophyta, H – Hemicryptophyta, H/G – transition form between Hemicryptophyta and Geophyta, P – Phanerophyta, T – Therophyta, T/H – transition form between Therophyta and Hemicryptophyta)

cant presence of plants from the *Compositae* and *Gramineae* families indicates the anthropogenic influence on the pasture flora of the family farms in Istria.

Analysis of quantity of taxa by localities showed that the flora of the farms investigated varied in number of plant families from 25 (Trošti) to 35 (Boljunski Katun). The greatest number of genera (120), species (155) and subspecies (13) was established at the locality of the Krnica farm.

According to the spectrum of life forms, the most numerous life forms are hemicryptophytes (49.83%), followed by therophytes (27.15%). Domination of hemicryptophytes (herbaceous plants) is typical of pasture (e.g. grassland) flora. On the other hand, the high percentage of therophytes shows the Mediterranean character of the pasture flora of the investigated area.

Analysis of life forms according to the localities of the farms showed that the greatest number of therophytes (33.93%) was established on locality of the family farm in Krnica, and the smallest number (9.00%) on the family farm in Slum. The pasture flora found in the farms varied in hemicryptophytes from 40.59% (Boljunski Katun) to 65.00% (Slum).

We established the presence of the taxon *Adonis aestivalis* L. (summer pheasant's eye) – endangered (EN) species of Croatian flora (NIKOLIĆ & TOPIĆ, 2004).

Tab. 2. Analysis of quantity of taxa by localities of the family farms in Istria

Taxa / Localities	Family	Genus	Species	Subspecies
1 – Slum	30	79	90	10
2 – Gregurinčići	31	84	105	6
3 – Boljunski Katun	35	84	94	7
4 – Trošti	25	55	60	2
5 – Krnica	31	120	155	13
6 – St. Grgur	28	91	113	7

Tab. 3. Spectrum of life forms by localities of the family farms in Istria (Ch – Chamaephyta, G – Geophyta, H – Hemicryptophyta, H/G – transition form between Hemicryptophyta and Geophyta, P – Phanerophyta, T – Therophyta, T/H – transition form between Therophyta and Hemicryptophyta)

Life form (in %) / Localities	Ch	G	H	H/G	P	T	T/H
1 – Slum	15.00	9.00	65.00	–	1.00	9.00	1.00
2 – Gregurinčiči	9.01	10.81	52.25	0.90	0.90	25.23	0.90
3 – Boljanski Katun	11.88	11.88	40.59	–	3.96	30.69	0.99
4 – Trošti	9.68	4.84	58.06	–	1.61	24.19	1.61
5 – Krnica	7.74	6.55	50.59	–	0.59	33.93	0.59
6 – St. Grgur	10.83	9.17	53.33	–	1.67	25.00	–

To complete studies about pasture flora on the family farms in Istria, further research is necessary. We expect that long-term research will allow for the definition of protective measures and the preservation of pastures, which will contribute not only to the full utilization of the pasture and the improvement of livestock production, but also to the preservation of plant diversity.

ACKNOWLEDGEMENTS

We wish to thank Professor Ivan Šugar, PhD. for his help in determining several specimens of Istrian pasture flora.

Received July 7, 2005

REFERENCES

- ALEGRO, A., 2003: Morfometrijske, ekološke i fitocenološke značajke vrsta roda *Festuca* L. (*Poaceae*) na travnjacima Istre. – M. Sc. Thesis, Faculty of Science & Mathematics, University of Zagreb, 131 p.
- ČARNI, A., 1996: Thermophilus vegetation of trampled habitats in Istria (Croatia and Slovenia). *Biologia-Bratislava* **51**, 405–409.
- HORVAT, I., 1962: Vegetacija planina zapadne Hrvatske. *Prirodoslovna istraživanja* **30**, Jugoslavenska akademija znanosti i umjetnosti, Zagreb.
- HORVATIĆ, S., 1963: Vegetacijska karta otoka Paga s općim pregledom vegetacijskih jedinica Hrvatskog primorja. *Prirodoslovna istraživanja* **33**, Jugoslavenska akademija znanosti i umjetnosti, Zagreb.
- ILIJANIĆ, L.J., 1967: Some characteristics of microclimate in *Hordeo-Poetum silvicolae* H-ić meadow association in Istria. *Acta Biol. Jugosl., Ekologija* **2**, 189–197.
- KALIGARIĆ, M. & L. POLDINI, 1997: New contributions on the typology of the vegetation of dry grasslands (*Scorzoneretalia villosae* H-IC 1975) in the North Adriatic Karst. *Gortania-Atti-del-Museo-Friulano-di-Storia-Naturale* **19**, 119–148.

- NIKOLIĆ, T. & J. TOPIĆ, eds., 2004: Crvena knjiga vaskularne flore Hrvatske, Ministarstvo kulture Republike Hrvatske, Državni zavod za zaštitu prirode, Zagreb.
- PERICIN, C., 2001: Fiori e piante dell'Istria distribuite per ambiente, Unione Italiana-Fiume, Università Popolare di Trieste, Rovigno-Trieste.
- PIGNATTI, S., 2002: Flora d'Italia I-III, Edagricole, Bologna.
- STARMÜHLER, W., 1998: Vorarbeiten zu einer »Flora von Istrien« Teil I. Carinthia II **188**, 535–576.
- STARMÜHLER, W., 1999: Vorarbeiten zu einer »Flora von Istrien« Teil II. Carinthia II **189**, 431–466.
- STARMÜHLER, W., 2000: Vorarbeiten zu einer »Flora von Istrien« Teil III. Carinthia II **190**, 381–422.
- STARMÜHLER, W., 2001: Vorarbeiten zu einer »Flora von Istrien« Teil IV. Carinthia II **191**, 409–457.
- STARMÜHLER, W., 2002: Vorarbeiten zu einer »Flora von Istrien« Teil V. Carinthia II **192**, 545–602.
- STARMÜHLER, W., 2003: Vorarbeiten zu einer »Flora von Istrien« Teil VI. Carinthia II **193**, 579–658.
- STARMÜHLER, W., 2003a: Vorarbeiten zu einer »Flora von Istrien« Teil VII. Carinthia II **194**, 591–651.
- ŠEGULJA, N., 1969: Prilog poznavanju kamenjarske vegetacije u Istri. Acta Bot. Croat. **28**, 367–371.
- ŠUGAR, I., 1984: Novi pogledi na biljni pokrov i biljnogeografsku rasčlanjenost Istre. Acta Bot. Croat. **43**, 225–234.
- ŠUGAR, I., 1992: Biljni pokrov Ćićarije. Buzetski zbornik **17**, 127–130.
- TOPIĆ, J., & N. ŠEGULJA, 2000: Floristic and ecological characteristics of the southernmost part of Istria (Croatia). Acta Bot. Croat. **59**, 179–200.
- TRINAJSTIĆ, I., 1999: As. *Saturejo-Caricetum humilis* Trinajstić (1981, nom. sol.) 1999., ass. nov.-sintaksonomska analiza flornoga sastava. Agronomski glasnik **61**, 23–34.
- TUTIN T. G., N. A., BURGESS, A. O. CHATER, J. R. EDMONDSON, V. H. HEYWOOD, D. M. MOORE, D. H. VALENTINE, S. M. WALTERS, & D. A. WEBB, eds., 1993: Flora Europaea 1–5. 2nd edn., reprint 2002, University Press, Cambridge.

SAŽETAK

Florističke značajke pašnjaka na obiteljskim poljoprivrednim gospodarstvima u Istri

I. Vitasović Kosić & M. Britvec

Travnjaci (livade i pašnjaci) su izuzetno značajna staništa koja bitno obogaćuju biljnu i krajobraznu raznolikost u Hrvatskoj. Kako je za održavanje biološke raznolikosti osobito važan način gospodarenja travnjacima u poljoprivredi, neophodno je istražiti biljni svijet pašnjaka kao važnog čimbenika o kojem ovisi poljoprivredna proizvodnja.

Floru pašnjaka u Istri istraživali smo na lokalitetima šest obiteljskih poljoprivrednih gospodarstava s ovčarskom proizvodnjom koja su smještena od juga do sjevera istarskog poluotoka: St. Grgur, Krnica, Trošći, Boljunski Katun, Gregurinčići i Slum.

Tijekom istraživanja 2003. godine ustanovili smo 291 vaskularnu biljku (268 vrsta i 23 podvrste). Većina je biljaka pripadala skupinama *Compositae* i *Gramineae*, slijedile su *Leguminosae* i *Labiatae*. Prisutnost velikog broja biljaka iz porodica glavočika (*Compositae*) i trava (*Gramineae*) ukazuje na antropogeni utjecaj na istraživanu floru. U spektru životnih oblika prevladavali su hemikriptofiti (49.83%) i terofiti (27.15%). Dominacija hemikriptofita, odnosno zeljastih biljaka tipična je za travnjake (pašnjake i livade), dok visoki postotak terofita potvrđuje mediteranski karakter pašnjačke flore istraživanih područja. Posebno treba istaknuti da smo ustanovili ljetni gorocvijet (*Adonis aestivalis* L.) – ugroženu vrstu hrvatske flore.

Očekuje se da će višegodišnja istraživanja omogućiti određivanje preporuka za cjelovito i optimalno gospodarenje pašnjacima na istraživanim obiteljskim gospodarstvima što će pridonijeti ne samo unapređenju poljoprivredne proizvodnje, već i očuvanju raznolikosti flore i vegetacije pašnjaka u Istri.