# The historical development, state and conservation of steppe woods in Slovakia

*Alexander Fehér*
*Slovak University of Agriculture in Nitra,*
*Marianska 190, SK-949 01 Nitra, Slovakia*
*sandfeher@gmail.com*

# Approaches

- J. Moravec steppe *sensu stricto*
- J. Jeník (later V. Ložek) steppe *sensu lato*

Summary by E. Krippel 1986: „step (resp. lesostep) je u nás prirodzený ekosystém, ktorý má svoje počiatky v dobe neskorého glaciálu, keď bola väčšia časť nášho územia s vegetačným krytom, zarastená stepnými spoločenstvami rastlín“ = steppe or wood steppe is a natural ecosystem in our country originated in the late glacial ...

# The origin ...

In Slovakia:

- origin late glacial or post-glacial?
- climax or sub-climax associations? are they self-sustainable?
- developed after the removal of the native forests?
- man made? would be more synanthropic ...
- **old steppic species? endemic species?**
- **humus accumulation (chernozems)**
- vegetation maintaned by human activities?
- **the campus theory?**
- **palynological analyses**
- climatic or edaphic or both?
- **continental and/or sub-mediterranean?**

This paper is based on a critical analysis of the Slovak literature.

# Palynology

- *Artemisia, Chenopodiaceae, Poaceae* ...

Alleröd, dryas:

- Cerová-Lieskové/Korlátkő-Lieszko: NAP 50 % (30 % *Poaceae*, 10 % *Chenopodiacea* ...)
- Pusté Uľany/Pusztafödémes: NAP 70 % (*Poaceae, Artemisia, Apiaceae, Asteraceae, Brassicaceae* ...)
- Vinné I/Vinna I: NAP 50 % (*Poaceae, Artemisia ... Helianthemum* ...)
- Vinné II/Vinna II: NAP (*Poaceae, Artemisia ... Ephedra*)

# „Lesostep“

In Slovakia, a special word, “lesostep” (les = wood, step = steppe), is used to identify the mosaic of woods and steppes regardless of substratum

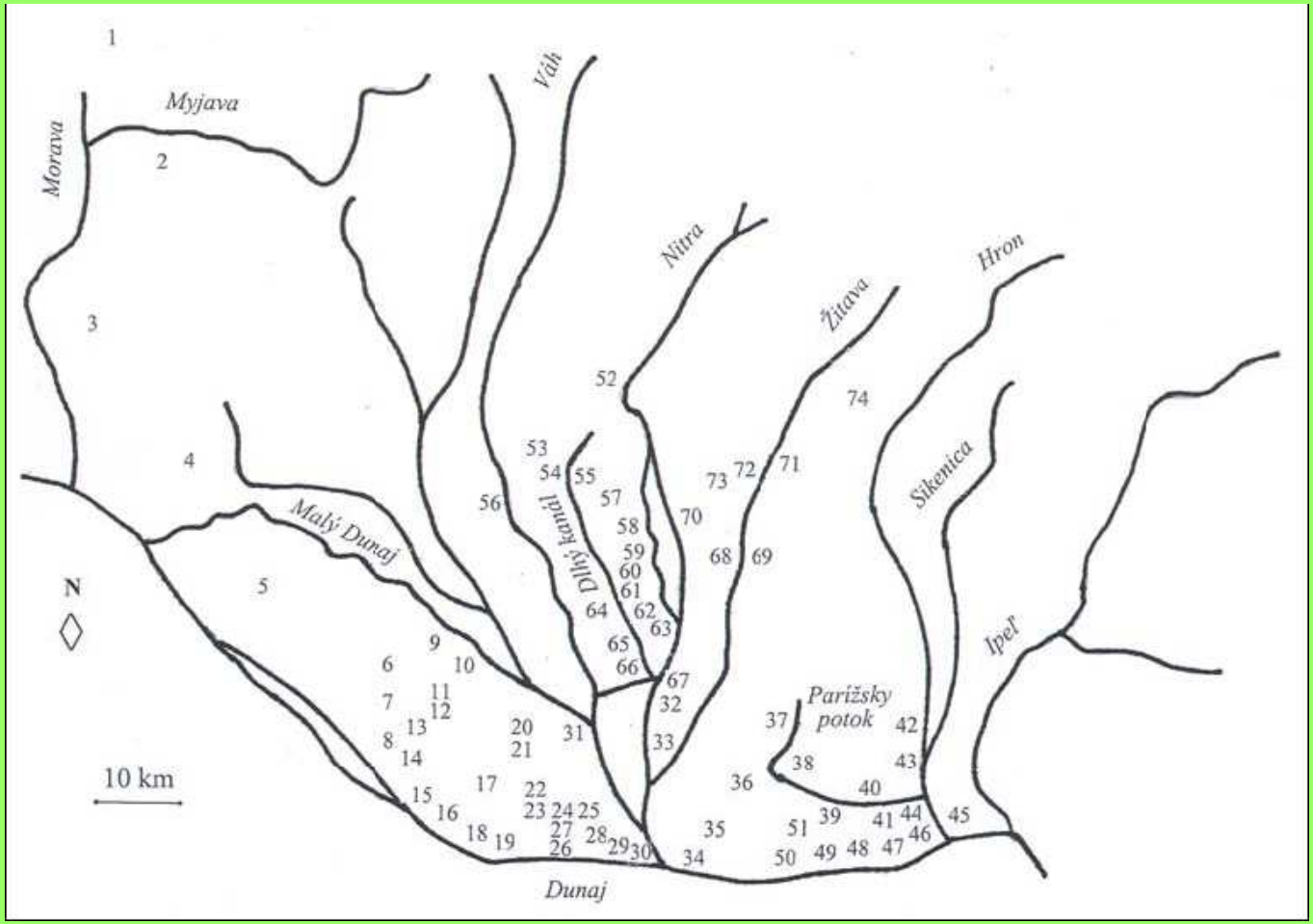
Krippel 1986: mosaic with sharp borders („mozaikovite ... ostro od seba odlíšených“), the same: Walter 1968


Žibrica/Zsibrice


Slepčany/Szelepcsény

# Močenok/Mocsonok

# Historical and/or recent alkali habitats in SW Slovakia (Fehér 2007)



„The Slovak culture is predominantly based on wood processing and utilization“ (Magic 1987).

Grazing, Extending cultivation areas, Burning, Cutting timber, Handycrafts, Charcoal production, Tannin production

# Examples

- In 1075 (near Nitra):

*„pratis ... latissima enim et longa sunt ad pastum animalium, equiorum, ovium, boum“*

Hron/Garam region (1540):

*... Unsere räte und comissarien sollen mit allen vleisz darob sein, damit Walachen, welche mit iren vieh halten die weld wast werden, von unseren grundten hinwegekh getan werden ...*

Mukačevo/Munkács – Trenčín/Trencsén (1570):

*... die maisten dörfer mit Raissen besetzt, welche vor vil jarn sich aus Reissen in dies land begeben herauskomen. ... Diese leut welcher ein grosse anzal ist und von Munkats an, bis gegen Trentschyn etlich tausent stark an dem gepürk gegen Polen mit haus und hof sitzen und der obrigkeit wenig nuz geben, sonder mer di wald verderben und zu taglicher dieberei gesinnet sein ...*

**„erestvín, eresztvény“**
**„chrasť, haraszt“**
**„titváň, tilalmas, tiltvány“**

- Hont county (1244): *parva silva erestven vocata*
- Nitra/Nyitra county (1333): *mons virgultosus*
- Kostolné Kračany/Egyházaskarcsa (1262): *quod per manus hominum silva nemorata de glandibus seminando fuerit procreata*

## Zobor

## Veľký Kýr/Nyitranagykér

# „Bor, búr, bôrik“ „bóros“

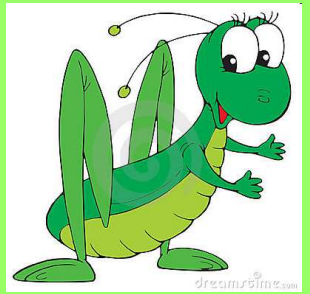
Hont county (1245):

*... Buerfeu ...*

Záhorie/Erdőhát region (1466):

*... potkal sem sie s lidmi na boru, kterížto jsu vybrali ves Malacky ...*

# Grasshoppers



„Sáskáknak Nittrára jövetellek valósaghos historiaja”
(Hahóthy 1748, in Nitra)

*„Látván az sáskák irtózató sokasságát, mingyár az népnek sokassága nyakra-főre nagy kiáltással futot, az városban kiváltképpen, mintegy siralmas rémülés, kiáltás, csöngetés, dobolás, lüvödözés s ugy várbeli mozsarak pattogása es az harangokk szomoru zöngése miatt már a szó sem hallatot, mivel az egész várost szép fényes tiszta üdöben 12 orakor délbe annyira beburitotta, hogy az napnak fenyit is elfogta ...*

*... s az nagy kialtással nem csak megalitván, de az rétekből ki is hajtván, de ennek sokaságát meg nem lehet mondani.”*

# Great bustard

(*Otis tarda*)

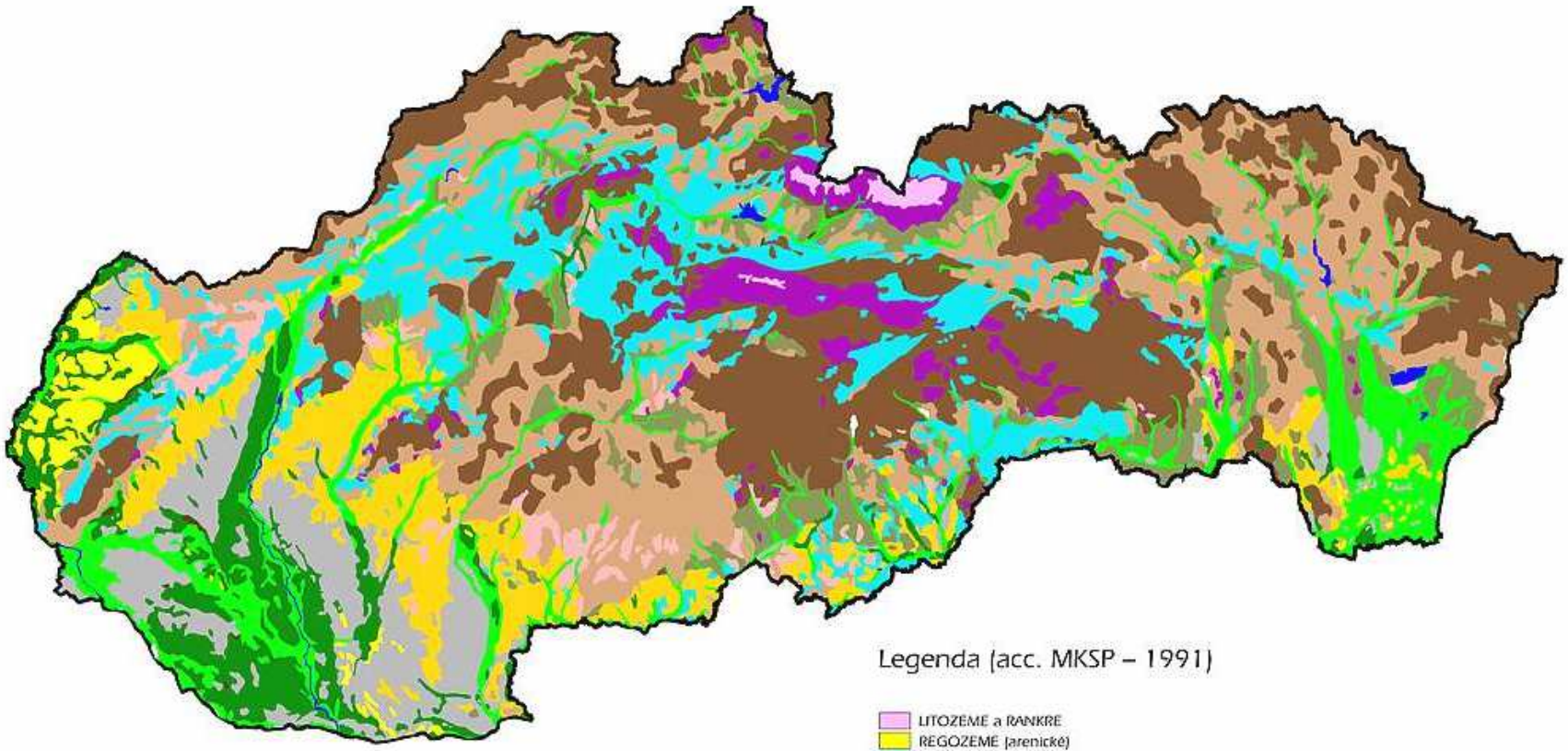
- Protected area: Dropie/Túzokos – no more individuals (the last one was Karcsi)
- New area: Sysľovské polia/Ürgés-földek near Bratislava/Pozsony (in 2005: nesting up to 10 females)
- In Lehnice/Lég: casual female(s)

Project: LIFE 05 NAT/SK/000115

More infos: www.dropy.sk

# WELCOME BACK IN SLOVAKIA ☺

**European bison/wisent (*Bison bonasus*)**



**Pôdna mapa Slovenska**

Legenda (acc. MKSP – 1991)

- LITOZEME a RANKRE
- REGOZEME (arenické)
- RENDZINY a PARARENDZINY
- ČERNOZEME
- HNEDOZEME
- LUVIZEME
- KAMBIZEME prevažne nasýtené
- KAMBIZEME prevažne kyslé
- PODZOLY
- PSEUDOGLEJE
- FLUVIZEME
- ČIERNICE
- ORGANOZEME
- výrazne kontaminované pôdy
- vodné plochy

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# Grass(lands) in woods

*„A marhaállománynak egész nyáron jártak az erdőbe fűért, mert a lekaszált szénát, a „legelőt”, meghagyták téli takarmánynak ... Kora tavaszon, amikor már fogyóban volt a télire bekészített takarmány, titokban az erdőbe jártak füvet szedni. Leginkább éjjel, kora hajnalban ...”* (Danter 1994, in Lelá/Leléd)

# Wood: pasture

Dried oak branches with leaves – winter feed for sheeps:

- „*cumulos frondium quercinarum ad usus ovium praeparatarum succenderiat*” (in the 17th cent., Ladice/Barslédec)

- *„ďalej mnohé stromy slúžia za krm rôznym zvieratám“* (Bernolák 1787)
- *„proventus silvarum ... variorum animalium impastione utilia sunt”* (Pankl 1832)

# 1. Sub-Mediterranean xero-thermophilous oak woods and colline limestone grasslands

(Michalko et al. 1987)

Quercion pubescentis-petreaea, Seslerio-Festucetum glaucae, Asplenio-Festucetum glaucae

- Can not be separated, definite complex, Jakucs (1961): Buschwald
- It forms enclaves in oak-hornbeam forests up to 400 m a.s.l. (max. 900 m)
- In certain cases: woodland is low and dense with small islands of steppes

## Jelenec/Gímes

# 2. Pontic-Pannonian xero-thermophilous oak woods

Aceri tatarici-Quercion

3 types:

- On the loess hill lands (chernozem, brunisols), subassociations primuletosum and with *Convallaria majalis*, (secondary) grasslands dominated by *Festuca valesiaca* or *Bromus erectus*
- On old terraces of the Danubian and East-Slovakian Plain on shallow chernozems on fluviatile clays, in contact with floodplain woods (Fraxino angustifoliae-Ulmetum carpinetosum),
- On sand-dunes rich in calcium, grasslands of Festucetum vaginatae (Čenkovská step?).

# 3. Sub-xerothermophilous oak woods and xerophilous pine woods

## Quercion pubescenti-petraeae, Cytiso ruthenici-Pinion

- the pine woods developed side-by-side with the oak woods (pure pine-woods are often secondary)
- Deforested sites: steppe-like grasslands (after grazing: pines come back)
- Pine-woods also in dry montanous (also apline!) valleys
- In SW Slovakia: with *Ephedra distachya*
- Relict: *Carex pediformis*

## Jelenec/Gímes

# 4. Acidophilous pine woods and sand-dune grasslands

Dicrano-Pinion, Pino-Quercion, Koelerio-Corynephoretea

- Boreal-continental pine and mixed pine woods with *Corynephorus canescens*
- Oak woods colonize the dunes enriched by mineralzation of the organic remains
- Atlantic-subatalntic Corynophorion canescentis (depends on summer precipitation)

# The first Slovak habitat catalogue

## (Ruzičková et al. 1996)

- The sub-Mediterranean thermophilous mixed oak woods 2114100 create mosaics in degraded and karst regions (Quercion pubescentis-petreaea, slt. Corneto-Quercetum).
- *South-East European mixed oak woods 2114200, now fertile arable lands (Aceri tatarici-Quercion pubescentis roboris, slt. Carpineto-Quercetum acerosum).*
- The  sub-xero-thermophilous oak and xerophilous pine woods 2114300 occur in contact zones of pine and oak forests and are dominated by both Euro-Asian continental steppe wood species and continental species of East European mixed forests (with relict species known from this habitat only) (Quercion pubescentis-petreaea, Cytiso ruthenici-Pinion, slt. Corneto-Quercetum, Corneto-Fagetum, Fago-Quercetum).
- *Acidophilous pine woods 2115200 – a succession phase of acidophilous oak woods? (Dicrano-Pinion, Pino-Quercion).*

# The new catalogues

The later catalogues considered the NATURA 2000 classification (Stanová, Valachovič ed. 2002, Viceníková, Polák 2003) and included:

- Pannonian woods with *Quercus pubescens* 91H0*,
- Euro-Siberian steppe woods with *Quercus spp.* 91I0*
- Pannonic inland sand dune thicket 91N0* (Junipero-Populetum albae)

But also

- Carpathian steppe pine woods (missing in the NATURA 2000 system but present in the CORINE, Emerald etc.).
- *Subcontinental Scots pine forests (missing in both the NATURA 2000 and Emerald systems but present in CORINE etc.)*

Steppe wood elements can be found also in other habitats and plant communities of Slovakia (e.g. Pannonian-Balkanic turkey oak-sessile oak forests 91M0*).

# Research? No, thank you ...

but

all these habitats are mapped in GIS layers (Šeffer, Lasák ed. 2004) but no special literature is available about the wood steppes (the xerophilous habitats of Slovakia are given in David et al. 2007 and sand dunes forests are characterized in Kalivodová et al. 2002).

## Pohranice/Pográny

# Special cases ...

(Hájková et al. 2011)

The Biele Karpaty/Bílé Karpaty/Fehér-Kárpátok story

- Biele Karpaty Mts harbour some of the most species-rich managed grasslands in Europe.
- The grasslands contain a number of rare and disjunctly distributed species (up to 520 km to the nearest site ...).
- Available phytogeographical, archeological and paleoecological knowledge provides indirect evidence for a prehistoric origin of the grasslands.
- The results indicate the existence of an ancient cultural landscape with a mosaic of open grasslands, natural forests and fields.

# Databases

- Information System of NATURA 2000
- Information System of Taxa and Habitats
- Botanical Information System
- Central Phytocoenosis Database
- Databank of Slovak Fauna
- CORINE biotopes (project)
- Information System of Slovak Habitats

The Forest Management Information System is administrated by Lesoprojekt in Zvolen/Zólyom. It uses a unified system for the whole country (exc. the military forests of 73.000 ha) and also contains the Database of Forest Management Plans.

# Treshold values of habitat coverage in Slovakia

(Habitats Directive in Slovakia, Annex I)

- Pannonian woods with *Quercus pubescens* 91H0* – 60 %
- Euro-Siberian steppe woods with *Quercus spp.* 91I0* – 60 %
- Pannonic inland sand dune thicket 91N0* (Junipero-Populetum albae) – 60 %

# Threats

- Land use changes (**abandonment of traditional use**, no pasture etc.), succession
- Agriculture (ploughing, recultivation), low yields (47%), herbicide and pesticides use, weeds
- **Afforestation – pine monocultures** (53%), from 1735, more intens. from 1807
- Hunting, **feeding wild animals** (eutriphication)
- Burning
- Ruderals and **biological invasion**: *Robinia pseudoacacia, Ailanthus altissima, Celtis occidentalis, Populus* x *canadnsis, Phytolacca americana, Ambrosia artemisiifolia, Solidago canadensis*
- Sand excavation, mining (limestones, dolomites etc.) – not well organized
- Locally: oil and natural gas production
- Tourism, Recreation, Collecting of rare plant and insect species
- **Urbanisation**, building, industrial parks, chemical pollution
- Waste dumps
- Military training (Borská nížina, Lešť)

# Legislation, management

- Act No. 543/2002
- Regulation No. 24/2003
- European Habitats Directive (Appendix)
- NATURA 2000 (127 European significant sites with xerothermic grass-herbaceous biotopes)

- PHARE Twinning SK2002/IB/EN/03
- A manual to maintain and promote favorable status of habitats is available, it also includes the evaluation and management of the steppe wood habitats (Polák, Saxa eds. 2005).

# Slovak favorable status manual

Pannonian woods with *Quercus pubescens* 91H0*

- real: 8.728 ha, potential: 23.674 ha

Euro-Siberian steppe woods with *Quercus spp.* 91I0*-

- on loess and sand - real: 95 ha, potential: 1097 ha
- with *Potentilla alba* - real: 3.692 ha, potential: 6.950 ha
- acidophilous - real: 515 ha, potential: 829 ha

Pannonic inland sand dune thicket 91N0* (Junipero-Populetum albae)

- real: 40 ha, potential: 120 ha

# Nature protection areas

| **Slovak name** | **Hungarian name** | **Category** | **Extention ($m^2$)** | **Year** |
|---|---|---|---|---|
| Čebovská lesostep | Csábi e.sz. | NR | 73,500 | 1988 |
| Čenkovská lesostep | Csenkei e.sz. | NNR | 796,000 | 1965 |
| Devínska lesostep | Dévényi e.sz. | NM | 50,966 | 1992 |
| Hrušovská lesostep | Körtvélyesi e.sz. | NNR | 408,500 | 1954 |
| Modrokamenská lesostep | Kékkői e.sz. | NR | 121,200 | 1986 |
| Tematínska lesostep | Temetvényi e.sz. | NNR | 596,700 | 1976 |
| Urpínska lesostep | Urpíni e.sz. | NR | 50,200 | 1997 |
| Zoborská lesostep | Zobori e.sz. | NNR | 230,800 | 1952 |


Búčska lúka
Medzi žilami
Langov mlyn
Kendeleš
Čenkovský les
Čenkov
ch.
hor.
Čenkov
ch.


Čenkovský les
ch.
hor.
Čenkov
ch.
Močariny

www.sopsr.sk

## Mužla-Čenkov/Muzsla-Csenke

# Changes and management in Čenkovská lesostep

(Melečková n.d.)

- Sub-climax? Extrazonal, pleistocene relict?
- 6120*, 6260*, 91N0*, 6410*, 91I0a*
- *Alkanna tinctoria, Colchicum arenaria, Iris arenaria, Ephedra dystachia, Fumana procumbens, Chrysopogon gryllus*, *Stipa spp.*
- Traditional use: animal pasture, esp. Mangalica pig (untill 1970ies)

- Reforestation: *Pine sylvestris*
- Invasion: *Robinia pseudoacacia, Ailanthus altissima, Celtis occidentalis, Abutilon theophrasti*
- Hunting (feeding - eutriphication)
- Wood cutting

- 2009 NGO: OZ UMBRA project on building of an information network

# Management models in Slovakia

## (Šefferová Stanová n.d.)

Management is based on Hungarian experiences ☺

- ŠOP SR
- In the Borská nížina region: e.g. Daphne Institute – in the military area, NGO BROZ: LIFE project – (sands.broz.sk)

- Pasture (sheep, goats), in Chotín/Hetény e.g. pigs (in the past)
- Pasture (wild animals)
- Mowing (almost not possible, 1x a year), after 1st July, part left, stubble more then 10 cm, economically not acceptable
- Management of invasions (Čenkov/Csenke, Chotín/Hetény), black locust management: sensu Z. Vajda, on clearcuts: *Calamagrostis epigejos* and *Conyza canedensis* – no effective method
- Pine deforestation (bark remoal), possible when stand is no older than 20-30 years, wood is to be taken

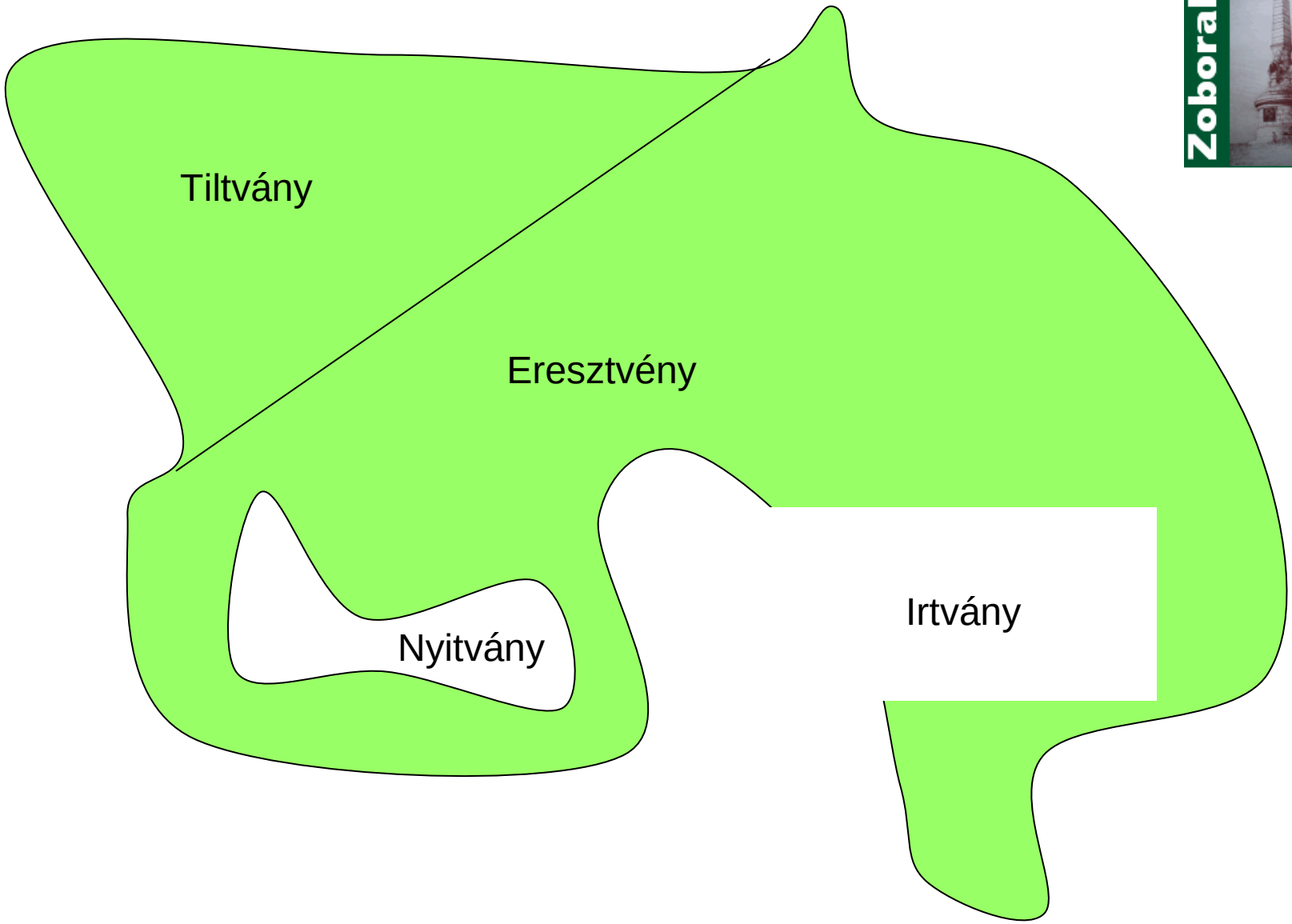
- Woods on sand dunes: protection woods in the wood management plans (soil protection), it is a legislation barrier in invasions managments



**Jurský Chlm/Szentgyörgyhalom and Branč/Berencs**

## Zobor

**Pohranice/**
**Pográny**




**Traditional Hungarian habitat names in the Podzoborier/Zoboralja region**

# Nyitvány???

- *„Az erdőket települők vágják, irtványok képződnek*
- *dombokon kidobják a gazt, a harasztot, hogy szőlőt tegyenek a helyébe. Ennek a neve viszont nyitvány”* (Ethey 1936)

- *„contra suam voluntem plantationes vinearum eradicaturas, quod vulgo nituan dicitur”* (in 1358, near Nitra)

**There is a lack of a comprehensive strategy for management of steppe woods in Slovakia ☹**