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Semi-natural grasslands as source of medicinal and aromatic plants in Latvia

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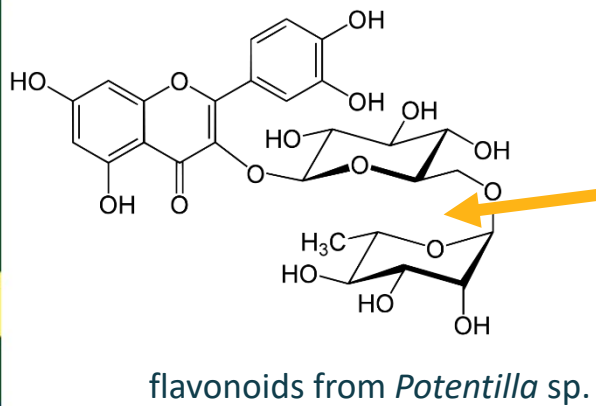
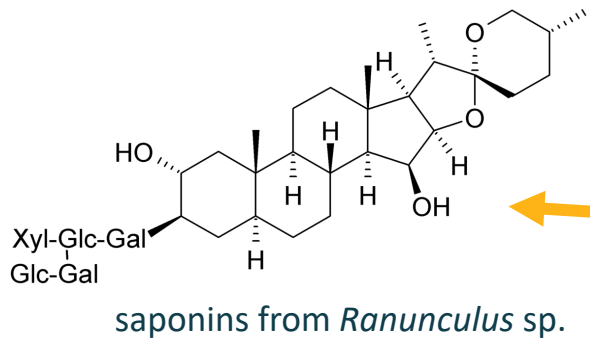
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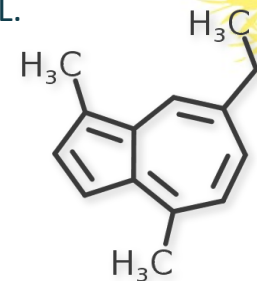
CAN WE GIVE AND ECONOMIC VALUE TO NATURE?

- ✓ Protecting Nature means investing in Nature; and public and private investors and donors need to see a value into their investment
- ✓ Value can be given by estimating the flow of goods and services that natural ecosystems can provide (direct method) to citizens and consumers
- ✓ Nature can be also evaluated by estimating the liability of citizens and consumers to pay to have access to the services and or goods that nature can provide (indirect method)
- ✓ Recently researchers has tried to even establish a specific Gross Ecosystemic Product (GEP) value (Ouyang et. Al. 2020) to define the global value of natural environments

MEDICINAL PLANTS AS INDICATORS OF VALUE IN NATURAL ECOSYSTEMS?



chamazulene from *Achillea millefolium* L.



MEDICINAL AND AROMATIC PLANTS IN FEW WORDS (AND NUMBERS)

- ✓ 34,408 plants from 377 families of angiosperm or gymnosperm, 550,000+ unique names used for these plants or herbal substance (source: Medicinal Plant Name Service, Kew Science, RBG Kew)
- ✓ More 3 billion people base they daily medicine on plants (Ayurveda and TCM in Asia)
- ✓ Emerging health problems (multidrug resistant bacteria) have a potential solution in natural alternatives (Taylor, 2013)
- ✓ Natural ecosystems playing a big role since most of the raw materials still coming from the collection in the wild (Schippmann *et al.* 2006)

Taylor P. W. 2013. <https://doi.org/10.1016/j.ijantimicag.2013.05.004>

Schippmann U. W. E., Leaman D., Cunningham A. B. 2006. A comparison of cultivation and wild collection of medicinal and aromatic plants under sustainability aspects. *Frontis*, 75-95.

AIM OF THIS STUDY

In this study we investigated natural grasslands as reservoirs of medicinal plants.

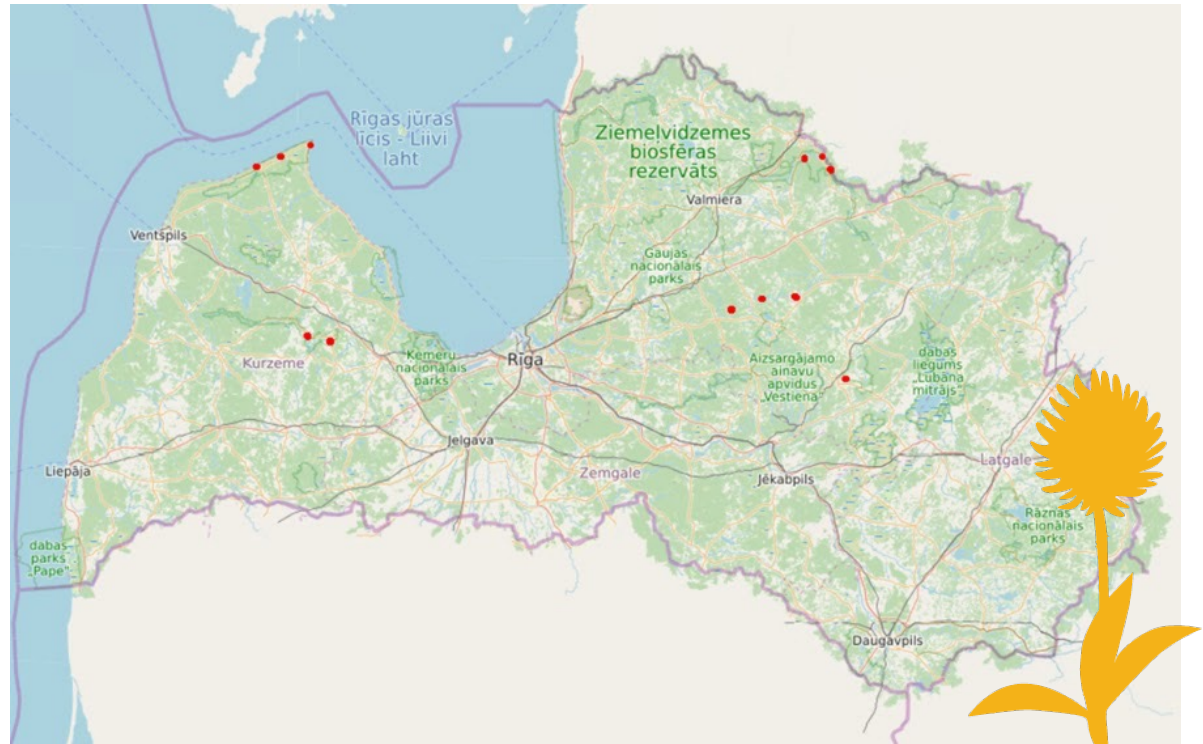
We tried to estimate the diversity of the species present and the abundance of each one.

We have developed a double method for attributing an economic value to both products and services related to these natural environments.



WHAT WE RESEARCHED?

- ✓ The study analysed 5 different types of high quality semi-natural grassland habitats (6120*, 6210*, 6230*, 6270*, 6530*) each one in three different locations (15 sites in total) in Latvia
- ✓ The composition of the "medicinal flora", measuring the abundance and richness of medicinal or aromatic plants, used in traditional medicine or present in the European Pharmacopoeia.
- ✓ A total of 51 major medicinal plants species have been observed.



METHODOLOGY: ON THE FIELD



- ✓ counting of medicinal plant species and richness in 1 m² frame with repetitions;
- ✓ measuring of the medicinal plant distribution within the plots with random sampling;
- ✓ biomass assessment of 10 medicinal plant individuals per each species found on plots.

Collected data were analysed applying R and MS Excel software to find correlations and calculate economical potential of the medicinal plant harvest and service produced by the grasslands.

METHODOLOGY: AT THE DESK

A value was attributed to the biomass as it is, sold on a market of raw materials with wholesale prices, as a regular company of wild harvesting. Prices were observed on international market thanks to interviews to privileged stakeholders.

and

A value was given to the product brought to the table of the consumer (value added product) considering the consumer itself generating that value with direct collection on the plants and preparation of the herbal tea portion. This is considered as a part of immaterial value of grassland fruition.



DATA RESULTS

| Habitat | n° of relevant medicinal species | estimated dry biomass per ha (kg) | value as raw material (euro/ha) | value as «per serving» criteria (euro/ha) |
|---------|----------------------------------|-----------------------------------|---------------------------------|---|
| 6120 | 15 | 257,07 | 380,86 | 4.113,10 |
| 6210 | 18 | 275,88 | 487,26 | 4.414,16 |
| 6230 | 19 | 643,61 | 1.322,58 | 10.297,79 |
| 6270 | 17 | 149,68 | 234,40 | 2.394,60 |
| 6530 | 18 | 193,47 | 342,65 | 3.095,60 |

DISCUSSION

- ✓ The number of major medicinal plants present on grasslands was quite homogeneous.
- ✓ Each type of the semi-natural grassland contained from 15 to 19 species of medicinal and aromatic plants.
- ✓ Number of individuals of all species varies from 1.475 plants/ha to 2.123 plants/ha.
- ✓ Total MAP's biomass ranges from 149,68 kg/ha to 643,61 kg/ha (average 303,94 kg/ha).
- ✓ Values of a potential raw material sales ranged from 234,40 euro/ha up to 1.322,58 euro/ha (average 553,55 euro/ha).
- ✓ Values of a potential “per serving” production ranges from 2.394,60 euro/ha up to 10.297,79 euro/ha (average 4.863,11 euro/ha).
- ✓ In terms of economic value, the highest productivity of medicinal and aromatic plants and estimated economic value was identified for 6230 grassland type.
- ✓ The lowest value was determined for the 6270 habitat type.

DISCUSSION

- ✓ The gained results allows to conclude that the traditionally less grass biomass producing semi-natural grassland types, such as 6230 or 6120, if appropriately maintained, can provide with much higher medicinal or aromatic plant production and related services then; for example, 6270 habitat that has higher economical value for livestock farming.
- ✓ The higher number of medicinal plant species (sort of niche biodiversity) can be linked to high value of the grassland.
- ✓ The values extrapolated from natural grassland potential production compared with regular farmed land is still quite comparable, in terms of raw goods production.
- ✓ These values are faraway higher than common farming products, if compared with value added products obtained in a self-procurement process.



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