

Small ruminant grazing, vegetation and landscaping

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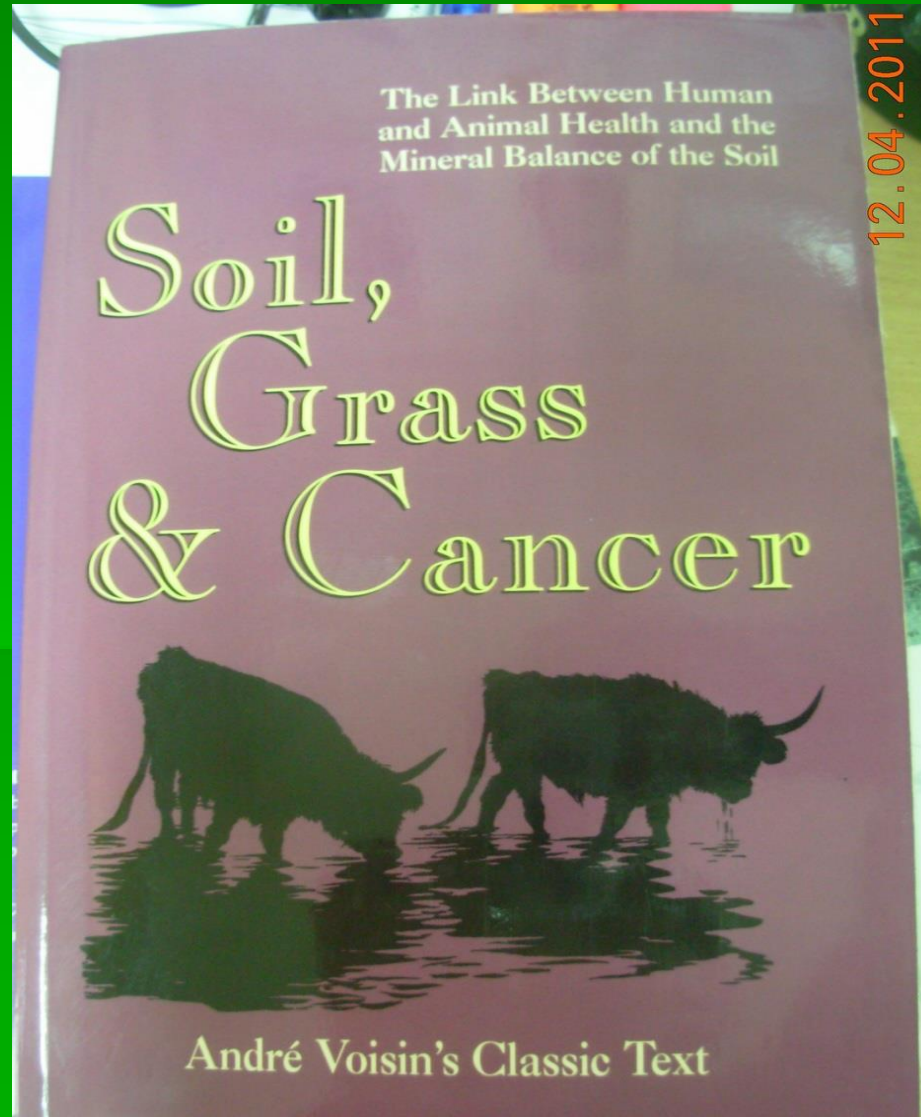
Why grazing?

To follow just trophic chain and

TO HAVE

- humans desire satisfied
- biodiversity of vegetation
- landscape intact
- small ruminants alive, healthy and productive

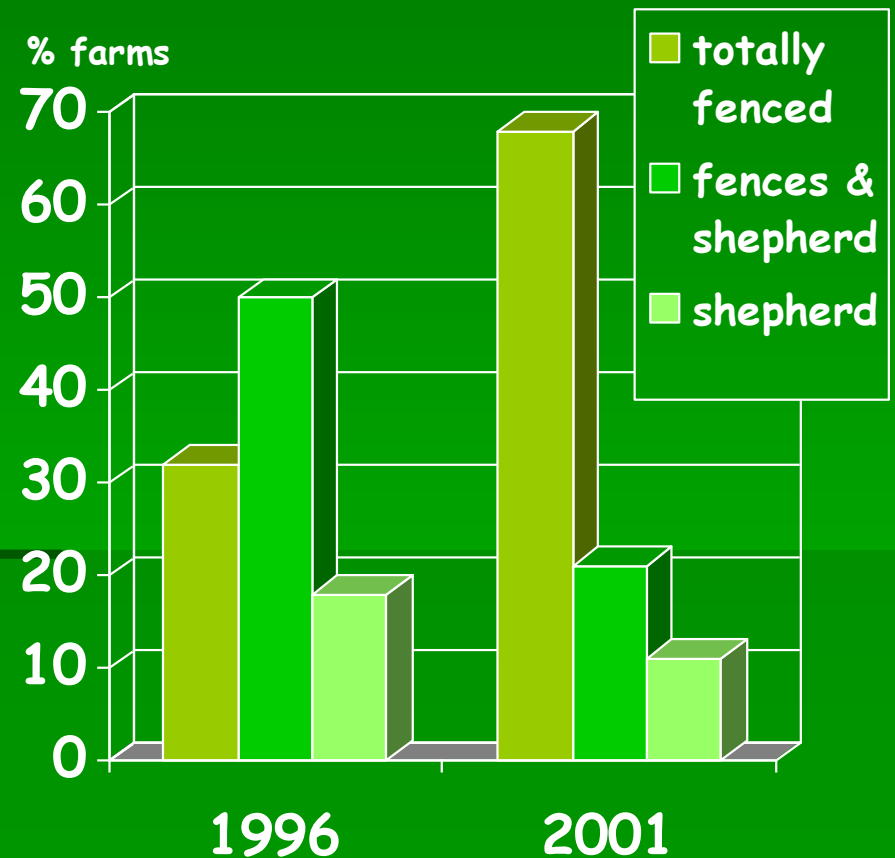
Holistic approach to grass from mid XX century



Another book by
André Voisin:
Grass
Productivity, 1959

THE END OF SHEPHERDING?

- Fencing is developing very fast to face the labour pressure.
- The French example of the dry region of Diois in southern Alps.



Source: Sauvaget & Poisson 2001

Temporary grazing is not the same as permanent relying on pasture of ruminant animal!

Real grazer

- Stability of relations animal – environment
- (24h/day; up to an entire year)
- Passing information between generations about the environment
- Self learning of eating plants in different seasons and times of the day
- Learning dam – offspring

Process of learning to eat all

- Long lasting process!!
- System „boom-bust” (USA) –in beef cattle learning (adjustement) lasted 3 years with temporary animal performance lowered by 40%!

(Provenza & Papachristou, 2009)

Grazing is not so fashionable in modern technologies!

Dry matter requirements [g per day] of growing sheep due to the feed type (ARC 1980)

HERBAGE	CONCENTRATES
57 g/kg W^{0,75}	90 g/kg W^{0,75}
100%	158%

Concentrates are winners! STANDARDIZATION!

**Desire to eat and accept
different chemical
compounds
= as body requires**

**[good reference: Cindy Engel (2002)
*WILD HEALTH – HOW ANIMALS
KEEP THEMSELVES WELL AND
WHAT WE CAN LEARN FROM THEM]***

**Animals have to make choices
themselves!!**

Grazing and browsing

Browsing by lambs but not so by ewes!
WHY?



SHEEP BROWSING (LAMBS) VS GRAZING (EWES)

Example of mineral content of herbage when soil pH = 4,0 and subsoil pH >7,0 (Ćwikła et al., 1999)

Item	Ca [% in DM]	P [% in DM]	Mg [% in DM]
Rose (Rosa ssp.) - leaves	1,32	0,15	2,30
Hawthorne (Crataegus ssp.) - leaves	1,40	0,12	1,20
Hawthorne – bark	4,65	0,05	0,07
Grasses - herbage	0,48	0,16	0,19
Grasses – hay	0,26	0,15	0,15

Fencing and sward quality and composition

▼ permanent pasture

▼ Tastier sward!!

▼ invasive *Heracleum*



Locality, time (diurnal & seasonal) and sequence of grazing

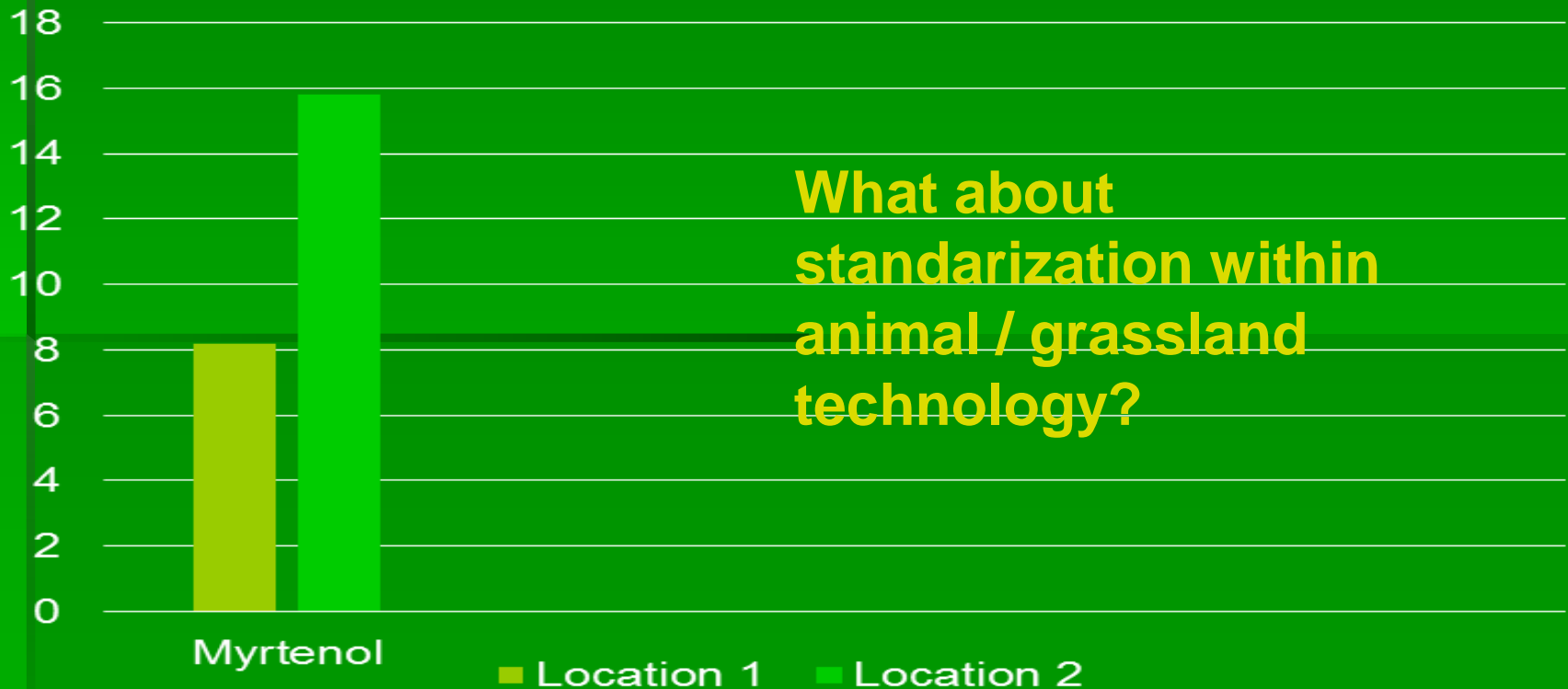
Sheep pasture in the Sudety Mountains - (altitude 550 m) = 51 plant species = pharmacy and threat! (Klimkowska et al. 2009):

Achillea millefolium/ Aegopodium podagraria/ Agrostis alba/ Agrostis vulgaris/ Alchemilla pastoralis/ Alopecurus geniculatus/ Anemone silvestris / Angelica silvestris/ Anthoxanthum odoratum/ Anthriscus silvestris / Arrhenatherum elatius/ Bellis perennis /)Carex Fusa/ Cirsium rivulare/ Dactylis glomerata/ Deschampsia caespitosa/ Dianthus deltoides/ Equisetum arvense/ Equisetum silvaticum / Festuca ovina / Festuca rubra/ Fragaria vesca/ Galium boreale/ Galium verum/ Geum riale / Glechoma hederacea / Heracleum sphondylium/ Hieracium pilosella / Hypericum perforatum/ Lathyrus pratensis/ Leontodon autumnalis/ Leontodon hispidus/ Luzula campestris / Lysimachia nummularis/ Myosotis arvensis / Phleum pratense/ Poa annua / Poa pratensis / Poa trivialis / Polygonum bistorta / Primula elatior / Ranunculus acer/ Ranunculus repens / Rumex acetosa / Stellaria graminea/ Taraxacum officinale / Trisetum flavescens / Urtica dioica/ Veronica chamaedrys / Vicia cracca/ Vicia sepium

FITONCIDES – plant substances with antibacterial, antiprotozoal, antifungal, antiviral actions:

- **Fenyloalkiloamines**
- **Glukozynolates**
- **Saponines**
- **Alkaloides**
- **Triterpenes**
- **Terpenoides**
- **Tannines**
- **Flawonoides**

Relative differences in just one essential oil in the leaves of Tansy (*Tanacetum vulgare*) due to location in the environment of Lithuania (Mockute & Judžentienė, 2003)



What about
standardization within
animal / grassland
technology?

The sequence of intake of active substances and ruminant performance !

(Provenza & Papachristou, 2009)

- Tannins => Terpens = ↑↑↑ (++)
- Terpens => Tannins = ↓↓↓ (--)

- Tannins/saponins => Alkaloids = ↑↑↑(++)
(ex. *Lotus corn.*) => *Festuca arund./ Phalaris arund.*)
- Alkaloids => Tannins = ↓↓↓ (--)
(ex. *Festuca arund./ Phalaris arund.* => *Lotus corn.*)

Choice of toxication or detoxication

Tannins – example of Birdsfoot-trefoil (*Lotus corniculatus*)

(Provenza & Papachristou, 2009)

- Lower parasitic invasions
- Protect from bloat
- Binding with proteins protects them from bacterial processing in the rumen
=>improvement in immunological functions
- Lower methan emissions
- In moderate quantities may influence colour and meat quality traits

Phytoestrogens

(A. Voisin 1959)

- Production in plants depends on P and S levels in the soil
- Low P & S soil status => ESTROGENS ↑↑↑
(*Trifolium mediterranean*)
- Pasture vs pasture!!! 922 vs 5898 ME/kg DM
=> 6x!!! (ME = mouse unit)

Effects:

Reproduction ↓↓↓

Milk production ↑↑↑

Phytoestrogens in Common Dandelion

(*Taraxacum officinale*) (Voisin, 1959)

- leaves \Rightarrow 77 ME/kg DM
- flowers \Rightarrow 800 ME/kg DM
- flower stems \Rightarrow 1788 ME/kg DM

DIFFERENCES 10 to >20x!!!

ME = Mouse Unit – concentration of oestrogens
stimulating oestrus in 50% of females

Landscaping and invasive plants

- Heracleum ssp (Giant hogweed)
- Solidago ssp (Golden rod)
-

Invasive *Heracleum* ssp.

1 human mortality in Poland 2015 documented
Not enough small ruminants in the landscape!

Waiting up to 9 years to bloom!!!
(Pysek et al. 2007)

Sheep pasture : 15 years



Xanthium albinum invasion of beef pasture
What about mixed grazing? - GOATS LIKE IT!



***Solidago ssp.* invasion of set aside agriculture landscape**





***Solidago* ssp after sheep grazing**



Heidschnucke grazing *Solidago* ssp. at Lower Silesia

What about pure productivity?

Carcass production in Poland on natural grasslands [own data] vs New Zealand and Ireland technologies [Connolly, Teagasc, 1998]

kg carcasses per ha

Poland	New Zealand	Ireland
80 - 90	184	216

more than 2x difference!

Conclusion

- We have to consider the trophic chain relations rather than just animal production technologies for the sustainability of landscape.

What to do?

- Build AGAIN long term animal & grassland interactions as local technologies
- Make small ruminants more common in the landscape by simplification of:
 - regulations ex.encephalopathy histeria,
 - management systems,
 - processing of animal produce at low production scale

**Make true grazer the
winner!**

Thank you!



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