



Biodiversity:
Good for cows?

Hans Nij Bijvank
Dierenkliniek De Woldberg Steenwijk

This presentation:

- Inspiration:
 - Visit to India and principles of ayurveda
 - Farmers who work with herb-rich, multi species pastures
- Secondary metabolites in herbs
- Multispecies pastures
- Do herbivores need secondary metabolites to stay healthy?



The use of herbs on Dutch dairy farms nowadays:

- The **interest** is growing:
 - Mainly for cow health: giving the cow more diversity
 - Also for improving soil
-
- Main **concerns**:
 - Will I get enough dry matter per hectare? >10.000 kg dm/hectare
 - Costs and persistence of the herbs



Visit to India with farmers and veterinarians in 2014, 2017

Goal: less use of antibiotics in both countries



Possibilities Ayurveda



- **Treatment clinical mastitis:**
 - curcuma (geelwortel) met aloë vera blad
 - 10 keer daags
 - uittrekken, wassen met warm water en dan op uier aanbrenge
- Goede **klinische** genezing; geen bo of celgetal

Possibilities Ayurveda

- **Calf-diarrhoea**
- Pasta maken met o.a. komijnzaad, peper, fenegriek, maanzaad, kurkuma, asafoetida en knoflook en ui
- In stroop
- Eenmalig ingeven
- opname deels via mondslijmvlies



Principles Ayurveda



- Aim is to get balance, aim is not to kill bacteria
- Use whole parts of plants, not 1 component/molecule
- Fresh better than conserved
- Local plants better than from far away

Situation in the Netherlands:

- Nederland is: “completely gone chemical”
- (dr Punniyamurthy)

- No botanical knowledge in veterinary school
- Old veterinary knowledge (< 1940) completely forgotten



“Single molecule treatment is not natural”

How can we use these principles in the dutch dairy farms?

- Seek more balance in the animal and the microbiome of the soil, the intestines and the udder
- Don't treat with single molecules (antibiotics)
- Which local plants are useful? (in the pasture)



What is the variation of species of plants fed to dairy cows?

- Grass
- Corn
- Soy hulls
- Rape seed
- Clover
- Alfalfa
- FodderBeets



What is the variation of species of plants in the diet of wild animals?

- chimpansees
- Galloway-cows in dutch nature: de Millingerwaard

Anti-parasitic properties in the chimpanzee diet

Mahale, Tanzania



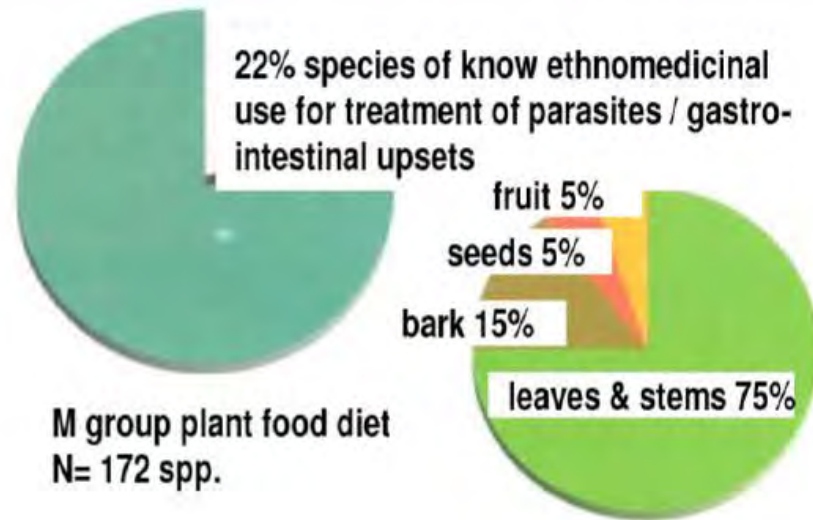
イチジクを食べるチンパンジー



ランドルフィア (Landolphia sp.)



プレモシンプロコス (Premnosymplocos sp.)



plant parts in the diet also used in African ethnomedicine

Tabel: Planten waarvan meerdere keren de consumptie door de Galloways is waargenomen.

Plantenfamilies	Nederlandse benaming	Latijnse benaming
Composieten	Akkerdistel Boerenwormkruid Duizendblad Echte kamille Grote klis Klein hoefblad Paardebloem	<i>Cirsium arvense</i> <i>Chrysanthemum vulgare</i> <i>Achillea millefolium</i> <i>Matricaria recutita</i> <i>Arctium lappa</i> <i>Tussilago farfara</i> <i>Taraxacum officinale</i>
Kruisbloemen	Koolsoort Herderstasje	<i>Brassica sp</i> <i>Capsella bursa-pastoris</i>
Rozen	Vijfvingerkruid Zwarte Braam	<i>Potentilla repens</i> <i>Rubus fruticosus</i>
Lipbloemen	Hondsdrif Paarse dovenetel	<i>Glechoma hederacea</i> <i>Lamium purpureum</i>
Ranonkels	Kruipende boterbloem Speenkruid	<i>Ranunculus repens</i> <i>Ranunculus ficaria</i>
Overig (familie)	Brandnetel (Brandnetel) Kleefkruid (Sterbladige) Ridderzuring (Duizendknoop) Smalle weegbree (Weegbree) Smeerwortel (Ruwbladige) Vogelmuur (Anjer) Witte klaver (Vlinderbloemen) Zachte Ooievaarsbek (Ooievaarsbek)	<i>Urtica dioica</i> <i>Galium aparine</i> <i>Rumex obtusifolius</i> <i>Plantago lanceolata</i> <i>Symphytum officinale</i> <i>Stellaria media</i> <i>Trifolium repens</i> <i>Geranium molle</i>
Bomen en heesters	Gewone Vlier (Kamperfoelie) Schietwilg (Wilgen)	<i>Sambucus nigra</i> <i>Salix alba</i>

Fred Provenza

- Herbivores eat 50-75 different species of plants per day, of which 3-5 species form the bulk of the diet.
- The rest is consumed for health benefits



Smalle Weegbree (*Plantago lanceolata*)



secondary metabolites in Plantago:

- **Aucubine:** mildly antimicrobial, laxating, anti-inflammatory, liver-protective, anti-oxidant
- **Acteoside:** mildly antimicrobial (urogenital infections), anti-fungus, anti-oxidant, blood-pressure regulant
- **Tannins** (protein-digestion rumen, anti-parasite).
- **Mucilage;** polysacharide; gel-forming)
- *Proceedings of the New Zealand Grassland Association 58: 77–86 (1996) 77*
- **Plantain (*Plantago lanceolata*) – a potential pasture species**
- A.V. STEWART
- *Pyne Gould Guinness Ltd, PO Box 3100, Christchurch*

Tannins



- Effect on protein digestion in rumen:
- Complexforming with free protein in rumen: digestion slowed down and changed to intestinal digestion (eg. Lotus corniculatus)
- Less loss of protein to ammonia
- Methane-production lower (Esparcette (Onobrychis viciifolia))



Paardenbloem (*Taraxacum officinale*)



- ✓ Bitter taste, stimulates saliva and digestion, flavonoïds, high in potassium, magnesium, selenium, cobalt
- ✓ Supports liverfunction
- ✓ Resistant to drought (taproot)

Cichorei (*Cichorium intybus*)





Ingredients Cichory

-minerals

high Potassium, Calcium, Zn, Copper, Phosfor

-good energy and protein content

-secondary metabolites:

tannin

lactucin, lactupicrin and 8-deoxylactucin

chicoriin (coumarin), chicoric acid (caffeinezuur derivaat)

Literatuur:

Insuline/glucose metabolism, antiviral, anti-inflammatory, liverprotective

Research Ireland sheep and lamb performance on multispecies



Grace C. et al, 2018

Grazing multispecies swards improves ewe and lamb
performance

results

- -ewes on multispecies maintained their weight during suckling period and ewes on grass monoculture pasture lost 4/5 kg weight
- -after 6 weeks the lambs on multispecies had average 1-2 kg more weight
- -growth till slaughter was 10% higher on multispecies versus grass

results



- Production of dry matter feed of the multispecies fields were the same as the monoculture fields with less Nitrogen per hectare: 90 kg N per hectare vs. 163 kg N per hectare
- De-worming of the lambs :average 1.5 time vs 2.7 time



Commercial multispecies herb-mix for farmers: salad buffet



70% Grasses

Perennial ryegrass, timothee (Phleum pratense), rietzwenk (Festuca arundinacea) , kropaar (Dactylis glomerata)

15% Clovers: *esparcette (Onobrychis viciifolia), red clover, white clover, witte weideklaver (trifolium repens), bastaardklaver Trifolium hybridum) , rolklaver (Lotus corniculatus), gele zoete honingklaver (Mellilotus officinalis)*

15% Kruiden:

cichory, pimpernel (Sanguisorba minor), duizendblad (Achille millefolium), Parsley (Petroselinum crispum), Plantago lanceolata





Thanks for your attention!

