Herbs in grassland and health of the dairy herd

Part 2: using free-lists to explore farmers' knowledge about herbs and cows health

Abstract

In the period April - October 2011 the research project 'Herbs in grasslands and health of the dairy herd' was carried out by the Louis Bolk Institute. In this project the relation between pasture herbs and health of dairy cattle was studied on 22 dairy farms. Participating farmers expressed a special interest in the inclusion of pasture herbs in the cows' diet to promote the health of their dairy cattle.

The extent to which today's dairy farmers have knowledge of how to use herbs towards animal health is unknown. This study explored the existing knowledge of farmers on herbs used for animal health using the free-lists method.

Results show that farmers know a number of herbs in their pastures. However, they do not fully know the potential medicinal value of the present herbs. Closing the gap between what farmers know already (that there are many herbs in their pastures) and the existing information (which herbs can have beneficial effects on the health of their dairy cows), through extension services or information campaigns, could have an ample impact on the way the health of dairy cattle is achieved today and maintained in the future. To evaluate if their animals are healthy, farmers rely mostly on their "eyes and experience" and less so on data which need to be measured with external devices. This suggests that Dutch dairy farmers possess a wide range of stockman ship skills.

Why herbs for cows' health? And what is a healthy cow?

It is increasingly important for farmers to "close" the cycle of their production system. There is a need for a production system that is more self-sufficient and resilient to external changes than the highly input-dependent production systems created over the last decades.

Making use of herbs in the promotion of animal health is an example of such a self-sufficient approach. Herbs have value in the prevention of diseases through increasing the animals' natural resistance. Herbs can also play a role because they supplement animals with specific requirements when they need it to counter acute (metabolic) disorders. Using herbs as an alternative to antibiotics and to counter microbial resistance is gaining attention. It repositions herbs from marginal and folkloristic, to protagonists of sustainable health management. Herbs could "close the cycle" of animal health on farms, where *health is cultivated, capitalized and redistributed* via herbs, cows and their produce: healthy milk and healthy manure. Herbs are also a "low-tech" solution that puts farmers in control of "*what can be done on the farm for the farm*", giving back to farmers their central role of managers.

The way a farmer identifies a "healthy cow" and a "health problem" is also a very important element in health management. Modern dairy farming practices increasingly depend on technical or mechanized solutions, putting farmer and animal at a larger distance from each other. Automated milking and concentrates dispensers do have advantages in terms of time management. However, they can have a downside in case "the eye" of the farmer is needed to identify a problem.

Who "knows" and how much?

The definition of *knowledge* is continuously changing and expanding. Identifying a person as more or less knowledgeable about something has more to do with the method used to assess this knowledge than with the knowledge itself. It is important to use caution when interpreting results derived from knowledge inquiries.

It is generally believed that organic and biodynamic farmers possess more knowledge about herbs and their use for health practices than conventional farmers. It is assumed that organic and biodynamic grasslands have a greater floral biodiversity compared to conventional ones. As a consequence, organic and biodynamic farmers are thought to be more familiar with a greater number of herbs. Moreover, biodynamic farmers do rely more on natural available sources and remedies and are therefore thought to know more about herbs. Other categories of farmers (e.g. female farmers, entrepreneurial farmers) could be more familiar with herbs, because of their role or interests, and thus have more knowledge.

When it comes to the way farmers deal with their animals' health it is important to take into consideration how farmers have organized the different roles and responsibilities at their farm: who is the responsible person for health management. The way farmers evaluate whether their cows are healthy or not can also tell a lot about the skills they possess and how much they rely on technical measurements to form an opinion.

The free-lists method and its results

To understand "who knows what" about herbs and health of dairy cows we applied the *free-lists* method. This method is often used in exploratory studies to understand traditional knowledge of tribes and ethnic groups. The method is easy to use. It makes use of a limited number of straightforward open questions. A person is asked to answer a question, for example: "Please write down all the herbs you know that are good for the health of your cows". When responding to this question, the respondent makes a list of all the herbs he or she knows, beginning with the ones which are most familiar. Basic assumptions of this method are that respondents will make a long list if they are very knowledgeable about herbs and that herbs which are more common in the area of a group of respondents will be found in many lists.

After finishing all inquiries, the "importance"(S) of a specific herb is calculated. "Importance"(S) is also called "coefficient of saliency index" (CSI) and tells us how important a specific item is within a group of respondents. S has a value between 0 (not at all important) and 1 (very important).

The calculation takes into account the number of times a specific herb was named in all lists (F), the position it had in the list (mP), and the total number of lists collected (N). In a simple equation:

$$S = F / (N * mP)$$

In this study 41 farmers, partners from farmers or farm workers from 22 farms participated. Only items listed by more than 10% of the respondents are presented in this paper.

Herbs in grassland and health of the dairy herd – part 2 – Louis Bolk Institute

LOUIS BOLK
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Results

Question 1 asked respondents to list "all the herbs which may have a beneficial effect on the health of their cows". Table 1 shows the results according to descending S. Besides S also the average position the highest ranking herbs had on the list and how many respondents mentioned these herbs. On average farmers listed 3.7 herbs. Note that 8 respondents listed "biodiversity" as important for the health of cows!

Table 1   Items listed in answer to: "list all the herbs which may have a positive effect on the health of your cows"

Common name	Latin name	Family	S	Average Rank	N. lists mentioned	Frequency (%)
White Clover	*Trifolium spp.*	*Fabaceae*	0.19	1.7	13	31.7
Common dandelion	*Taraxacum officinale*	*Asteraceae*	0.18	2.3	17	41.5
Chamomile	*Matricaria chamomilla*	*Asteraceae*	0.11	2.3	10	24.4
Stinging nettle	*Urtica dioica*	*Urticaceae*	0.09	3.9	15	36.6
Biodiversity			0.08	2.5	8	19.5
Docks	*Rumex spp.*	*Polygonaceae*	0.03	3.8	5	12.2
Plantain	*Plantago spp.*	*Plantaginaceae*	0.03	4.7	6	14.6

Question 2 asked farmers to list "which herbs are present in your own pastures". The average length of lists was 7.8 items, longer than the average list length in question 1. This result in table 2 tells that farmers are aware of the presence of herbs in their pastures, but do not see them as necessarily good for their cows. In general it cannot be said that *all herbs* are good for the health of dairy cows, but in our case many of the ones listed were. This means that farmers do not fully know the potential medicinal value of their pastures.

Table 2   Items reported in answer to "which herbs are present in your own pastures"

Common name	Latin name	Family	S	Average Rank	N. lists mentioned	Frequency (%)
Common dandelion	*Taraxacum officinale*	*Asteraceae*	0.19	4.3	33	80.5
Clover	*Trifolium spp.*	*Fabaceae*	0.10	3.6	14	34.1
Stinging nettle	*Urtica dioica*	*Urticaceae*	0.09	4.4	16	39.0
Buttercup	*Ranunculus spp.*	*Ranunculaceae*	0.09	5.8	21	51.2
Broad-leaved dock	*Rumex obtusifolius*	*Polygonaceae*	0.09	5.1	18	43.9
Shepherd's-purse	*Capsella bursa-pastoris*	*Brassicaceae*	0.08	3.7	13	31.7
Chamomile	*Matricaria chamomilla*	*Asteraceae*	0.08	3.0	10	24.4
Red Clover	*Trifolium pratense*	*Fabaceae*	0.07	2.8	8	19.5
Docks	*Rumex spp.*	*Polygonaceae*	0.07	4.4	12	29.3
White clover	*Trifolium repens*	*Fabaceae*	0.07	3.3	9	22.0
Plantain	*Plantago spp.*	*Plantaginaceae*	0.07	4.1	11	26.8
Cuckoo flower	*Cardamine pratensis*	*Brassicaceae*	0.05	5.6	11	26.8
Narrowleaf plantain	*Plantago lanceolata*	*Plantaginaceae*	0.04	4.8	7	17.1
Thistle	*Cirsium spp.*	*Asteraceae*	0.03	5.8	8	19.5
Forger Me Not	*Myosotis spp.*	*Boraginaceae*	0.03	5.0	6	14.6
Common plantain	*Plantago major*	*Plantaginaceae*	0.03	5.8	7	17.1
Daisy	*Bellis perennis*	*Asteraceae*	0.03	5.2	6	14.6
Common chickweed	*Stellaria spp.*	*Caryophyllaceae*	0.02	7.1	7	17.1
Common sorrel	*Rumex acetosa*	*Polygonaceae*	0.02	5.6	5	12.2
Creeping thistle	*Cirsium arvense*	*Asteraceae*	0.02	7.0	5	12.2
Cow parsley	*Anthriscus sylvestris*	*Apiaceae*	0.02	7.2	5	12.2

Question 3 asked farmers to list "how do you recognize a healthy cow"? Farmers listed on average 6.3 items. For a better understanding all answers were also classified in categories. The results in table 3 show that farmers rely mostly on their "eyes and experience" to evaluate if a cow is healthy or not, and less so on data which need to be measured with external devices. This suggests that Dutch dairy farmers possess a wide range of stockman ship skills including instruments to evaluate health of their herds.

Herbs in grassland and health of the dairy herd – part 2 – Louis Bolk Institute

Table 3: Items reported in answer to: "how do you recognize a healthy cow?"

Item	Category	S	Average Rank	N. lists mentioned	Frequency (%)
Shiny coat	External appearance	0.40	1.9	32	78.0
Eyes	External appearance	0.18	3.1	22	53.7
Walking	Behaviour	0.11	4.6	20	48.8
Rumination	Behaviour	0.11	4.4	19	46.3
Milk	Physiological check	0.08	4.7	15	36.6
Responsiveness	Behaviour	0.07	3.9	11	26.8
Posture	Behaviour	0.07	4.3	12	29.3
Feeding behaviour	Behaviour	0.06	4.5	11	26.8
Appearance/Radiation	External appearance	0.05	2.4	5	12.2
Full rumen	External appearance	0.04	5.7	9	22.0
Vigilance	Behaviour	0.03	4.3	6	14.6
Ears temperature	Physiological check	0.03	3.8	5	12.2
Hooves	External appearance	0.03	4.2	5	12.2
Social behaviour	Behaviour	0.02	6.8	7	17.1
Manure	Physiological check	0.02	5.0	5	12.2

Questions 4 and 5 were about the most important health problems of cows and calves respectively. In table 4 and 5 the results are presented. The average length of list was 3.0 for cows and 1.8 for calves. Mastitis and hoof problems are the most important health problems. Although ranked 2nd important, milk fever is the most frequent mentioned disease, in 24 of the 41 lists. To some extent milk fever is associated with a lack of minerals in the diet of the milking cow, and the introduction of certain herbs could play an important role in the prevention and management.

Table 4: Items reported in answer to "Which sicknesses occur on your farm regarding milking cows?"

Item	S	Average Rank	N. lists mentioned	Frequency (%)
Mastitis	0.31	1.5	19	46.3
Post parturient hypocalcaemia (milk fever)	0.25	2.3	24	58.5
Udder inflammation	0.19	1.7	13	31.7
Hooves problems	0.12	2.7	13	31.7
Dermatitis digitalis (Mortellaro)	0.06	2.5	6	14.6

Table 5: Items reported in answer to "Which sicknesses occur on your farm regarding calves?"

Item	S	Average Rank	N. lists mentioned	Frequency (%)
Diarrhoea	0.37	1.3	19	46.3
Coccidiosis	0.10	1.0	4	9.8
Pneumonia	0.05	2.4	5	12.2

The first goal of the study was to find out:

- which herbs farmers know to be important for the health of dairy cattle
- which signals farmers find essential to identify a healthy cow
- which are the most important health problems in cows and calves

Secondly it was also relevant to know "who knows more" amongst the different farmers and farm workers. To do so the length of all lists produced for all the different questions was statistically tested for differences. The assumption was that who produces a longer list, knows more about the subject. Respondents were categorized into: farming type, gender, role & responsibilities at the farm and adoption of Pure Graze© practices or not. The comparison based on farming type gave statistically significant results, but only on question 1 "which herbs are good for the health of your cows". In this respect conventional farmers produced significantly shorter list compared to biodynamic farmers, but not compared to organic farmers.

The other sets of comparisons did not result in clear indications whether categories of farmers or farm workers are more knowledgeable about herbs or health than others.

Final remarks...

Herbs are a "democratic medicinal strategy" in their role of aid from within the farm. Less reliance on external inputs and a reinforced "ownership" of knowledge amongst farmers can be a positive addition to today's dairy farming practices, especially in a time where we observe high-tech practices going hand in hand with traditional stockman ship skills. Closing the gap between what farmers know already (that there are many herbs in their pastures) and the extra information (that many herbs can have beneficial effects on the health of their dairy cows), through extension services or information campaigns, could have an ample impact on the way the health of dairy cattle is achieved today and maintained in the future.

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