



BY GEROLD RAHMANN

### Livestock research

# ORGANIC ANIMAL HUSBANDRY NEEDS SCIENTIFIC SUPPORT

Organic farming is based on the idea of an environmentally-friendly food production system with high animal welfare standards. But in the real world there are many difficulties in reaching these goals. Many problems in animal health and welfare remain unresolved, presenting a challenge for individual producers and the industry as a whole. These include: achieving balanced, 100%-organic, feed rations that produce adequate growth rates and high quality products, animal-friendly transport and slaughtering, the sustainable use of local resources and, last but not least, profitability and the efficient use of resources.

Animal welfare is a central objective of organic farming and one of the most important reasons why consumers purchase organic products. In 1980 IFOAM set out its objective of "providing farm animals with living conditions based on animal welfare and an ethical basis" This subsequently became incorporated into the European organic farming standards (as defined in 834/2007/EC). The reality, however, often differs from this aim.

- Hybrid poultry - bred for cages and intensive keeping - are kept on organic farms and often show severe health and behavioural (including feather pecking and cannibalism) problems. Male chicks from laying hen populations are often killed instead of fattened. No farm-reared breeds of poultry or double purpose breeds are used because they do not fulfil the performance and production requirements of farmers. Poultry is still kept in large flocks, often with several thousand animals in one barn.

- In pig production, the castration of piglets is an unsolved problem. Conventional pig production has forced the abolition of castration but this is causing problems in organic pig farming as it has an impact on farming practice (i.e. the keeping, feeding and housing of boars), the environment (i.e., the climatic impact of anaesthetics), profitability (i.e. production cost advantages, marketing sacrifices) and meat quality (i.e. odour, tenderness, juiciness, low intramuscular fat content). Another problem in this sector is the mortality rate of piglets, which is higher in organic than in conventional systems.

- The organic dairy and beef sectors also experience problems. The removal of horns from beef cattle is still widely practiced on organic farms. The life expectancy of organic dairy cows is no higher than in conventional dairy systems and the use of animal medications is not significantly less (although more natural medications are used). The tethering of cows is still permitted on small organic farms (with less than 35 cows) and is widely practiced. Milk production is still heavily reliant on the use of cereals, the organic ration can contain up to 40% concentrates: 50% in the high lactation phase and, in practice, even more.

Feeding livestock is one of the most difficult problems. As a consequence of the BSE crisis, omnivores, such as pigs and poultry, have been turned into vegetarians/vegans yet they are still expected to maintain rapid daily weight gains (and therefore need a high level of intake of essential amino acids). While conventional animal husbandry permits the

use of synthetic essential amino acids, these are not allowed in organic agriculture. But plant based organic feeds have not closed this protein gap for fast-growing young animals (such as piglets and broilers) and high-yielding animals (such as sows and laying hens). The "vegan" diets for these animals do not contain sufficient essential amino acids. From the start of 2012, 100% organic feeding will be required by law in the EU, although the problem of how to close this gap has not yet been solved.

Numerous farm evaluations, carried out under the German Federal Organic Scheme (Bundesprogramm Ökologischer Landbau) have showed that animal husbandry on many organic farms is unsatisfactory in terms of both animal welfare and production yields. This creates both an economic and an image risk.

## ORGANIC ANIMAL HUSBANDRY DOES NOT ALWAYS FULFIL ITS PROMISES

### How can science help?

Organic animal husbandry can be improved through scientific effort, communication and the application of these findings. The main focal points should be animal productivity and welfare, resource efficiency, green house gas mitigation, biodiversity, product quality and, last but not least, profitability. In 2000, the German Government established the Institute of Organic Farming, to develop sustainable and efficient organic farming systems with a focus on animal husbandry. It has a 600

ha experimental station with modern laboratories, stables and equipment, where about 100 staff members, including more than 30 scientists, carry out interdisciplinary research in dairy farming, pig production and keeping goats and sheep (Rahman et al 2011)

### Example 1: Comparison of dairy cow breeds


Since 2004 the Institute has been experimenting on its research farm, comparing the high-yielding German Holstein dairy cow, which is widely utilized in both conventional and organic dairy production, with the locally typical German Rotbunten, an old 'dual-use' breed. There is a special barn with two identical halves, where two herds of 50 animals each are kept separate, but under the same management conditions in terms of stabling, feeding and milking. We are conducting a long-term study, collecting and comparing breed-specific data for numerous criteria, particularly related to performance and health. We are investigating the very high-risk period after calving, when milk production increases and it is difficult to provide the dam with all its calorific requirements. The results showed that the Holstein experienced more metabolic stresses, but that this did not

### Scientific Challenges

Scientific support of organic husbandry has already achieved much in the past ten years. Animal research is a long and complex business. The organic animal husbandry research agenda should focus on the following issues.

- Reducing the negative environmental impacts (CO<sub>2</sub> emissions, dust, smells, nitrates) from organic animal husbandry.
- Increasing the efficiency of the use of on-farm and local resources.
- Improving animal health and equity.
- Increasing product quality and production output per animal.
- Guaranteeing and securing competitiveness on global markets.

Solutions can only be found in an interdisciplinary system approach in the context of New Farming System Research and Development (NFSR+D). Much remains to be done, let us press on (Rahmann et al. 2009).



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necessarily lead to an increased incidence of disease. In terms of udder health – a key issue in dairy farming – the Holstein performed better than the Rotbunten. This leads us to question the common assumption that higher productivity is inevitably accompanied by an increased susceptibility to disease and to argue that management plays a critical role. We recommend that organic farmers choose the breed that best suits them and their operation and to not be dogmatic about origin. This does not negate the very strong argument for preserving old local breeds in the interest of biodiversity.

#### Example 2: 100% organic feed for pigs

The Institute has also studied the ability of pigs to overcome the problems associated with the amino-acid deficiency during the initial fattening period through later compensatory growth. This deficiency occurs when 100% organic feed is used. An experimental group, which received significantly more food in the later stages than a control group, gained more weight in the later stages with the overall rate of feed conversion remaining unaffected. Our results led us conclude that it is possible to achieve economically sustainable growth performance and 'butcher-quality' pigs with 100% organic rations.



#### Example 3: Biological control of endo-parasites

On organic farms, grazing young cattle, sheep and goats are vulnerable to infection by gastro-intestinal nematodes. This is a major problem for animal health, which is of considerable economic importance. Sub-clinical helminth infections can result in up to a 40% reduction in live weight gain among lambs and a 6-30% reduction in their food intake. Parasitized sheep can suffer a 40% loss in wool production and a 15% decline in milk production. Over the past 30 years parasite control in sheep and goats has been almost exclusively achieved by the use of proprietary de-worming drugs (anthelmintics) but nematodes are becoming increasingly resistant against these drenches.

Laboratory research on *D. flagrans* has demonstrated the potential of this biological agent to catch the larvae of endoparasites. However, our field trials showed only a limited benefit in feeding *D. flagrans* to the ruminants and we could not confirm the laboratory results. Quite probably the

effectiveness of the method was limited by heavy rainfall and better application methods could be developed. Further research here would be useful.

The use of tanniferous plants (e.g. chicory) and plant extracts (e.g. oak bark) is another possible option in an integrated strategy to control nematodes. Shrubs are an excellent source of tannins and other important micronutrients for small ruminants and browsing shrubs seems to have positive impacts on animal health and welfare. Yet farmers need to select varieties that are well-adapted to local conditions. The Institute is analyzing local shrubs for their growth and their anthelmintic effects on goats and sheep. Recent findings are promising but have not yet been validated for scientific publication. They show the potential of developing

new strategies to prevent and control endoparasites, not only in organic farming, but also in conventional systems. This takes time and a lot of effort.

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Professor Gerold Rahmann is Director of the Institute of Organic Farming at the German Research Centre for Rural Development, Forests and Fisheries (vTI). Details of the Institute's research programme can be found at its website: [www.vti.bund.de](http://www.vti.bund.de)

#### Further Reading

Rahmann G, Oppermann R, Paulsen HM, Weißmann F (2009) Good, but not good enough? Research and development needs in organic farming. *Agriculture and Forestry Research* 59(1):29-40.