

## ORGANIC AGRICULTURE

### Loek uit het Broek\*

*(Control organic quality/Eco-agriculture Consultant,  
Schone Aussicht 9D-62 33 Kelkheim/Fischbach, Germany)*

For many people the history of agriculture really started with the research done by Justus von Liebig (1803 - 1873), the "Father of modern agriculture" and soon after the NPK - synthetic fertilisers were born. The industrialisation of western society in the early beginnings of this century also had its impact on the development of agriculture. It not only changed the structure of the farms and farm-lands through extensive modernization but also supplied the farmer with these synthetic fertilisers, pesticides and herbicides. Agri-Culture became Agri-Business.

Some farmers and scientists were however cautious about these developments. Nobody can deny that during this time the knowledge about farming increased tremendously and provided many a platform for important developments. The critics concerned themselves more with the dangerous one-sided development of it all. Maximum yields were aimed at by feeding the plant with increased NPK - fertilizer doses; through non-selective insecticides, ecological balances were destroyed to an extreme that penquins on the south pole died of DDT - residues; the national environment and social farm structures changed for the worse.

Scientists like Dr Rudolf Steiner in Germany, Dr Mueller and Dr Rusch in Switzerland, Prof. Raoul Lemaire and Dr Boucher in France, Dr Allbrecht in the USA and Howard in England stressed the importance of retaining and improving the fertility of the soil. The idea gained ground that one should not feed the plant but feed the soil; a healthy, balanced soil will produce an optimal yield of crops. Therefore organic agricultural systems developed a whole science to improve the chemical, biological and physical

---

\* The Institute does not necessarily endorse the views expressed in papers contributed by persons other than members of its staff.

structure of the soil. This includes the optimal use and working up of natural resources like (leguminous) green manures, stable manures and compost, but also rock minerals, blood meal and bonemeal and (not polluted) sewage sludge; stressing rotation of crops, including leguminous crops like beans, alfalfa and undersowing with clovers; and improving soil structure through the organic manures and mulching, and also appropriate cultivation.

Organic agricultural systems also includes the exclusion of all chemical herbicides. Not only does this massive killing of weeds damage the ecological balance with regard to the vegetation, insect balance and so on, but it is also proven that herbicides have an adverse effect on soil-insects and - bacteria and thus the soil fertility. Mechanical - and flame-weeding are the measures employed as well as good rotation with arable crops and vegetables. With insect-pest and diseases first of all basic preventive measures like ecological balances, high soil fertility and use of insect and disease - resistant varieties should be considered. If it is absolutely essential, natural products like pyrethrum or copper-sprays are allowed as strictly defined by the IFOAM international organic standards. A nearly classical insect control in organic agriculture was the highly successful release of the parasitic wasp *Macrocentrus homonae* from Java in 1935/36 against the Tea Tortrix. The Tea Tortrix (*Homona coffearia*) is an indigenous pest in Sri Lanka and was first recorded, as the name indicates, on coffee. However from 1910 to the late 1930's it became an increasing and serious pest to tea industry. The release of the wasp proved to give an excellent biological control of the caterpillar.

### Improvement of Quality

The use of organic agriculture as an important technique to further the development of agriculture as a whole has become now a world-wide issue. What can one say about the quality of the products ?

Research done by Stoll on apples (Schuster, 1983) showed clearly that an increase in nitrogen-fertilisation leads to a diminishing of quality at a certain nitrogen - level (see Fig. 1)

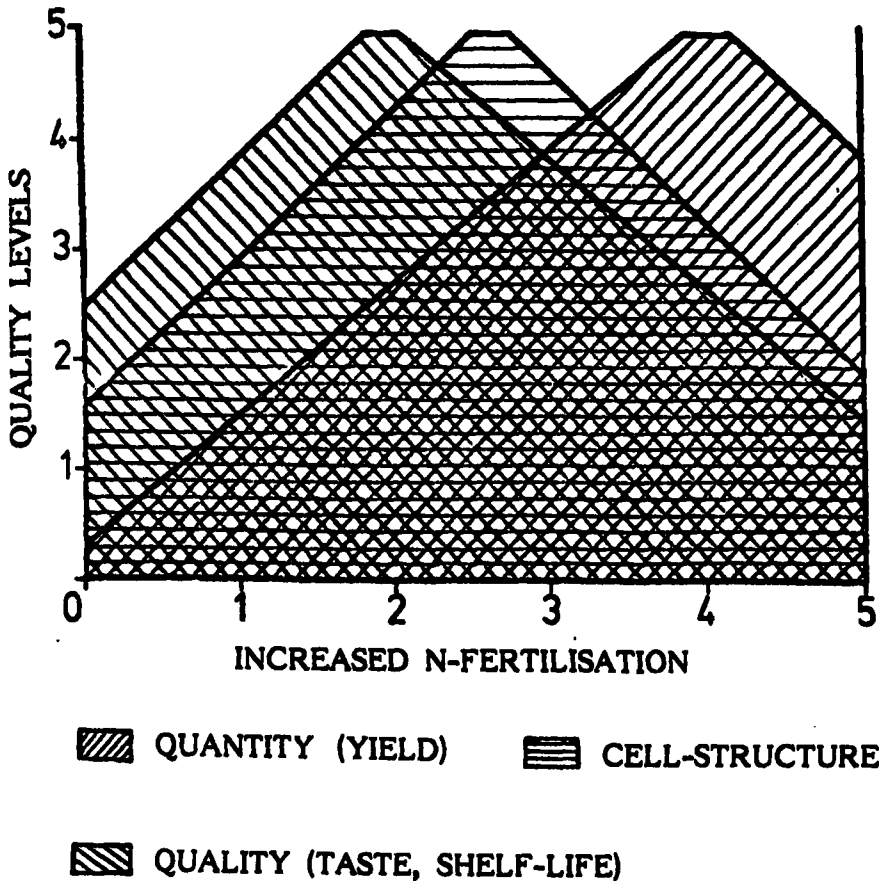


Fig 1 - The relation between quality and yield with increased nitrogen fertilisation, based on research done on apples (Stoll, in Schuster'83).

These optimal levels can be obtained by proper organic husbandry management.

Dr Schuphan, Director of the National Institute of Quality Research in Germany, found that organically treated vegetables showed an average increase of (Wortmann, '82).

- 23% dry matter
- 10% proteins
- 20% vitamin C
- 19% total sugar
- 13% methionine (essential amino acid)
- 77% iron
- 10% potassium
- 10% calcium
- 13% phosphorus

and a decrease of:

- 12% sodium
- 43% free amino acids
- 93% nitrates

The nitrates are a cause for concern as these can be transformed into highly cancerous nitrites. Though vitamin C will reduce the percentage of nitrites released, vitamin C content is low in conventionally grown products. Further research in this area (Locheretz *et al.*, 1981, Luenzer, 1982) confirms the above results of increased quality of organic products. Also for the production of tea it is thought that increasing soil fertility and organic manures will increase the quality of the end product.

### The Organic food market and legislation

A boom for these products commenced in the late 1960's and by mid 1970's there was increasing consumer awareness for products of a better quality, without residues and grown under ecologically viable conditions.

A number of producer and trade organizations came into existence, which supplied the consumers with the right kind of information and guaranteed the products through inspection system and guarantee-labels.

To prevent cheating in the market and to further improve the techniques in organic agriculture several governments took action. In Germany and the Netherlands there is now an official chair for organic agriculture at the Universities and several research programs are supported in most European and North American countries. Official legislation has been passed in e.g. France and Austria, which define and accept the benefits of organic agriculture.

Organic agriculture is not a step backwards but a step forward to a more comprehensive understanding of agriculture and the farm place to give sufficient yields of good quality crops to feed the world.

#### REFERENCES

- LOCKERETZ, W., G SHEARES and O.M KOHL (1981).  
"Organic Farming in the Corn Belt", Science,  
211, 540-547.
- LUNENZER, I (1982). "Konventioneller und "Ouekologischer  
Landbau" in Krauth/Luenzer (1982), 31-60.
- SCHUSTER, G. (1983). "Bio-Kost - wirklich mehr Glaube  
als Wissenschaft ?", Natur 9, 86-93.
- WORTMANN, M. (1982). "Konventionelle und biologische  
Landwirtschaft im Spannungsfeld von "Oekonomie  
und Oekologie" Verlag Lebendige Erde, Darmstadt.