



NATURLAND STANDARDS

ORGANIC INSECT BREEDING

Version 05/2019

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Preface

Introduction

Certified organic agriculture, as practised in accordance with the written standards of Naturland - Registered Association for Organic Agriculture - has become an established concept. A comparison of the first draft of the "Standards for Organic Agriculture" passed in 1982 after the association was founded with the currently valid version will reveal two aspects of this modern form of land cultivation and the processing of the resulting products: on the one hand its dynamism and potential for development and on the other its stability and consistency. The development of standards and their implementation are the core mission of any certified association for organic agriculture. Standards have to be proven to be workable. They have to be adapted to changing conditions and be extended to cover new areas. The growth of Naturland and its organisations since the association's establishment is a reflection of the success of its work and confirms that this form of cultivation has gained wide acceptance and appreciation among farmers, food producers and consumers.

Standards for specific areas

The Naturland standards existed long before the EU passed its first legal regulations on organic agriculture. Even today the consistent development of our standards provides major impetus; they incorporate ideas that are taken seriously by the legislators.

As they stand today, Naturland's standards are not limited solely to the specific method of cultivation described in detail in its standards on plant production and animal husbandry. For some years now, standards have been developed to cover many specific areas which require special guidelines, such as horticulture and viticulture, bee-keeping, harvesting of wild grown products, and aquaculture. In the same measure that the standards have evolved to cover various forms of cultivation, they also incorporate the next stage - the processing of this produce. The production and processing of food produce, such as bread and bakery products, milk and dairy products, beer and meat, etc. are described in specific standards for different categories of food produces. Whilst foodstuffs are the original sphere of interests, standards have also been drawn up to cover other areas of cultivation, such as organic forestry and timber processing.

Adherence to the elementary principles

To ensure that Naturland's standards develop consistently, it is essential that the fundamental principles of organic agriculture are adhered to. It is also crucial to withstand hasty and short-lived trends and any temptation to sacrifice elementary principles for the sake of immediate success. Standards can only provide a framework, since organic agriculture cannot function on the basis of mere regulations. It is realised by consensus on a common aim. Nevertheless, exact and binding rules are necessary in practice, whilst leaving enough flexibility for adaptation to the particular requirements of each agricultural operation.

The experts - farmers, consumers, processors and scientists - who contribute to the development of Naturland's standards have always offered new solutions to the problems posed. The framework of Naturland's standards is dictated by the core fundamental principles of certified organic agriculture: the obligation to treat the elementary basics of our lives with prudence and responsibility. A common starting-point, sustained management, the active protection of nature and the climate, safekeeping and preservation of the soil, air and water and the protection of the consumers are at the heart of all Naturland's standards. This also implies tolerance, the respectful treatment of one's fellow human beings and the acceptance of social responsibility.

Naturland's standards - basis for certification

Standards will only endure and make a lasting impact if they can be clearly monitored and be put into consistent practice. Any decisions involved have to be seen to be made impartially and on neutral, unbiased terms. This is guaranteed by calling on the services of independent and autonomous committees - standards committee, inspection body and certification committee - as well as by the composition of the committees - consisting of diverse interest groups such as scientists, agriculturists and consumers. Independent inspection procedures and the consistent application of Naturland's standards form the basis of the production of high quality products cultivated in a balance with nature and the environment. This quality is visibly documented by the Naturland logo.

Naturland's quality management - national and international

For producers, processors and consumers, certification by Naturland stands for a reliable quality management system, for the dependability of the organically grown produce, from its cultivation to the finished product.

Naturland has been accredited to the international norm ISO/IEC 17065 since 1998. This accreditation confirms that certification is performed to defined norms.

Scope of application of the standards

These standards cover all species of insects with appropriate legal authorisation for use as fodder or human consumption and which are kept under the conditions listed in Part B.

It is possible to breed other species of insects once application made to Naturland has been approved.

Part A. General regulations

I. Contracts and certification procedure

1. Prerequisites for granting the producer contract

Prior to the conclusion of a producer contract, the association must be given the opportunity to acquire sufficient information on the external and internal conditions of the operation.

This enterprise is obliged to provide any information necessary to assess the conversion conditions. This includes particularly the method of management that has been practised to date (type and numbers of stock, structural elements, treatment measures etc.), the economic situation of the farm and the prevailing environmental conditions.

If possible causes of contamination with dubious or harmful substances are detected, analyses have to be produced or tests carried out prior to the conclusion of a producer contract. These analyses may show that a producer contract is only possible under specific conditions or not at all. All production storage facilities run by the producer must be recorded in a business description. Naturland is entitled to ask for the production of an environmental audit before certification.

2. Producer contract

On signing the producer contract, the producer commits himself to adhering to Naturland standards and to extending the conversion to all areas of the enterprise that are managed or farmed under his responsibility (whole farm conversion). The principle of the manager's unit is to be applied, i.e. one and the same farm manager must not manage a conventional and an organically operated farm at the same time¹.

The conclusion of a producer contract is possible at any time of the year.

The conclusion of a producer contract does not entitle the producer to the use of the association's logo. A separate license contract has to be concluded for this.

3. Standards

These standards are obligatory for all producers that have concluded a producer contract with Naturland e. V. (registered association). If single regulations or parts of these standards should not be applicable under different climatic conditions, the Naturland standards committee has to draft an amendment or addition to the standards which has to be passed by the assembly of delegates. Naturland's certification committee is entitled to allow a producer contractor to diverge from Naturland's standards in specific points, where the exception is justified, and for a limited period of time, provided that the general management of the farming operation according to Naturland's standards is not adversely affected.

Only the latest version of the standards as passed by the assembly of delegates is valid. Naturland will inform the contractual producers of any changes. If the standards are changed, a deadline can be set for the implementation of these changes.

Violations of the standards will be prosecuted according to the sanction catalogue (producer contract Appendix IV).

The validity of overriding state legislation and ordinances shall, however, remain unaffected by these standards. The requirements of directives (EC) No 834/2007 and No 889/2008 (EU directive on organic agriculture) have to be observed.

4. Conversion

During conversion to organic agriculture, the manager introduces management practises in accordance with the principles of organic agriculture throughout the entire operation.

¹ Manager's unit: composed of manager and farming unit. The manager is the natural person running a farm independently and responsibly (farm manager). The farming unit is a clearly marked managing sphere on which distinctly separate records are kept for inspection and documentation.

The official start of management in accordance with these standards is marked by the provable last management measure not permitted by the standards.

The provisions defined in Part B under II. 3. apply to insect breeding operations.

The conversion of the entire farm must occur under economically acceptable basic conditions. It can therefore take place gradually to cover ever greater areas of the farmland cultivated in accordance with the standards. Where conversion is carried out gradually, it is imperative for the areas under various stages of conversion to be clearly and explicitly delineated. Simultaneous production of products belonging to different stages of certification that cannot be clearly differentiated is not permissible. The conversion of the entire farming operation, in the case of gradual implementation, must be completed within 5 years at the latest.

In a conversion plan to be worked out, in particular, all those structural changes possibly becoming necessary, the type and numbers of stock and the feeding schedule as well as the hygienic measures intended shall be documented.

5. Changes in the farming system

Where the breeding facilities and/or business premises are bought or leased as newly added facilities, the insects kept here are required to complete the conversion cycles defined in Part B under II. 3.

6. Documentation and inspection

The currently valid details shall be reported to Naturland. Regarding product flow (e.g. additional purchases of feed as well as the sale of farm products), likewise, records shall be kept in accordance with Naturland's standards. Furthermore, a farm diary shall be kept (e.g. on the incidence of diseases, mortality rates, implementation of special hygienic measures). An obligation for an immediate reporting shall exist in respect of all such factors that can negatively affect the quality of the products.

Previously announced (at least once a year) and unannounced visits and inspections by personnel authorised by Naturland shall monitor adherence to the standards. They shall be provided with unrestricted access and scrutinising opportunities into all the relevant areas of the farm. Upon request, all the documents relating to the managing of the farming operation as well as any other relevant information shall be made available.

All stages of the value chain have to be recorded when the farm is inspected, although, in the case of co-operatives, for example, individual areas can be organised to conform with the internal control system (ICS). Where third parties operate on behalf of the producer (e.g. treatment, storage, processing, transport), the processor must take steps (such as the conclusion of a sub-contracting agreement) to ensure that the standards are applied and that adherence to them can be monitored by Naturland.

7. Certification

The Naturland certification committee confirms that the producer is adhering to the standards with the annual certification letter. If the producer violates current standards, the penalties listed in the catalogue of sanctions, which is part of the producer contract, can be imposed.

It is standard practice for complaints in connection with matters within Naturland's sphere of responsibility to be addressed to Naturland's head offices in Grärfelfing, Germany.

8. Labelling and marketing

The labelling of products enables the trader legally responsible for the product to be identified.

The provisions of regulations (EC) 834/2007 and 889/2008, as far as they apply to the EU Community logo and the declaration of origin (place where the aquaculture products were produced) are to be observed.

The application of the Naturland logo is regulated in a particular licence agreement with the Naturland Trade-mark Company.

The insects and the products derived from them may display the "Naturland" word mark or logo to show they originate from certified organic agriculture.

II. General (management) regulations resp. other predominant provisions

1. Sustainable management

Organic agriculture is particularly committed to sustainable management. This includes the respectful treatment of nature and the environment, the sustainable use of natural resources, the acceptance of social responsibility and the maintenance of economic performance.

The benefits derived from natural ecosystems and their economic performance must be maintained. Damage to ecosystems should be kept to a minimum.

Biodiversity is to be maintained and fostered on farms to the best of the farmer's ability.

Energy should be used as efficiently as possible and renewable energy resources should be used for preference.

Water is a valuable natural commodity, the protection and sustainable use of which are of crucial importance. Natural water resources are to be used careful and in a sustainable manner.

Wherever waste is unavoidable, it should be disposed of in an eco-friendly manner or recycled. Organic residues should be re-used and preferably composted.

Preference is to be given to procuring raw materials and goods from suppliers in close proximity.

2. Quality assurance

Production in terms of these standards should allow for organic produce of high sensory quality and safety in regard to health. To avoid contamination with prohibited substances or means which might impair the organic quality, appropriate measures shall be taken. In particular, the operation must show from its procedures that possible environmental pollutants are monitored by suitable analytical methods and that prompt and comprehensive measures are taken in cases where limits are exceeded.

Where reasonable suspicion exists that the product quality is substantially impaired through contamination, Naturland should be informed. Naturland may require an analysis to be undertaken to detect the level of contamination and contamination sources and follow up on the case. Appropriate action has to be taken on complaints related to the compliance with Naturland certification requirements that are directed to the operation by third parties. Records shall be kept of the complaint and corrective action taken.

3. Non-employment of GMO and GMO derivatives

Genetically modified organisms (GMOs) and their derivatives are incompatible with organic production. Products produced according to the Naturland standards must therefore be manufactured throughout the whole of their production and value chain without the use of genetically modified organisms (GMOs) and GMO derivatives².

The definitions given under sec. 2 of Directive 2001/18/EC of the European Parliament and of the Council, and the exclusion criteria for genetic engineering of the eco-regulations Council Regulation (EC) No. 834/2007 and Commission Regulation (EC) No. 889/2008 apply.

Even the unintentional contamination of products certified by Naturland with genetically modified organisms may also lead to certification being denied.

4. Non-use of nanomaterials

By "nanomaterials", Naturland means: substances which have been consciously and deliberately designed, technically manufactured or produced by human inducement (anthropogenic) with the intention of obtaining very specific characteristics (e. g. shape, surface properties or chemical properties) at the nanoscale (approx. 1 – 300 nm in at least one dimension) such as only possible at the nanoscale. Particles with larger diameters may come under this definition in cases where there is evidence of effects specific to the nanoscale at this size. Particles accidentally generated at the nanoscale, which can occur in the course of traditional processing methods (such as, for example, homogenisation, grinding, foaming, freezing) or as natural environmental ele-

² A "GMO derivative" is any substance produced from or by means of GMOs but not containing any GMOs itself. "The use of GMOs and GMO derivatives" means their use as a foodstuff, an ingredient of foodstuffs (including additives and flavouring), processing additives (including extraction solvents), animal feed, compound feed, the raw materials of animal feed, fodder additives, processing additives for animal feed, certain products for animal feed, pesticides, fertilisers, soil ameliorators, seed, vegetative propagation material and animals. For the purposes of these standards, the following definitions apply: 1. organism: any biological unit capable of reproduction or passing on genetic material. 2. genetically modified organism (GMO): an organism, the genetic material of which has been modified in such a way as is not possible in a natural manner by cross-breeding and/or natural recombination.

ments (e. g. volcanic or airborne particles) or in foodstuffs (e. g. monosaccharides, amino acids or fatty acids) at the nanoscale are excluded from this definition.

The environmental effects on nanomaterials and their impact on human beings are so far not sufficiently known. For this reason, products grown and processed and certified by Naturland must be manufactured without the application of anthropogenic nanomaterials. Nanomaterials should also be avoided in packaging. They are only permissible if the nanomaterials are firmly integrated in the packaging material. Nanomaterials in layers or coatings which are in direct contact with products certified to the Naturland standards must not be used.

5. Storage

Storage under special conditions (controlled atmosphere, temperature control, humidity regulation and drying of the stored goods) is permitted. The application of chemical storage-protection agents is prohibited. Only storage measures that exclude the contamination of the harvest with harmful substances are permitted. This also applies to the materials and detergents used (ref. the regulations of Part C. General Processing Standards VI. 11, where they apply to pest control). Radioactive irradiations are prohibited.

If there are products of different certification statuses on the farm, they have to be stored clearly separated. Substances which are prohibited by these standards and contravene the conversion status in question may no longer be stored on the farm (ref. also Part C. General Processing Standards VI 9. Storage, Bottling, Bagging and Transport).

6. The sale of purchased merchandise

The sale of purchased products for direct marketing, e.g. on market stalls, is possible. Regional products should be preferred wherever possible. Separate bookkeeping for all the purchased merchandise has to be done. The labelling of the products must be unequivocal with respect to their origin and method of production. Farm products and bought products have to be declared separately.

Conventional merchandise may only be sold if there is proof that equivalent organic or sustainably produced products are not available. These products have to be clearly labelled as "conventionally produced".

It is not permissible to offer one and the same product from organic and conventional cultivation or fishery at the same time.

7. Purchase of means of production and equipment

Special attention has to be paid to the ecological impact of production means and equipment. Preference is to be given to substances on a natural basis (e.g. oils, fats). Auxiliary materials of rainforest timber are prohibited. Care should be taken to save energy.

8. Exchange of farming equipment between different agricultural operating systems (certified organic/conventional)

The exchange of machinery and equipment (e.g. in machinery co-operations) between certified organic aquacultures and conventional operations is possible. Machines and equipment that are also utilised by conventional aquacultures must be cleaned thoroughly in the case of contamination with substances that do not comply with Naturland's standards before being used on a Naturland operation.

9. Use of foil and fleeces, nets and technical mulching materials

Decomposable matters are to be striven for, e.g. cotton, flax mats, mulching paper or organic foil, as far as these allow a reasonable organic cultivation.

For protected structure coverings like plastic mulches, fleeces, insect netting and silage wrapping, only products based on polyethylene (PE) and polypropylene (PP) or other polycarbonates are allowed. These shall be removed after use and shall not be burned on the farmland. The use of polyvinyl chloride (PVC) based products is prohibited. Recycling is recommended.

Materials that are on the farm already and do not comply with these conditions may be used up during the conversion period.

10. Biogas plants

Generating energy by fermenting biomass can be an important component of future energy supply within the context of renewable energy as a whole, besides wind, water, solar and geothermal energy and combustion of organic materials like wood.

Biogas plants in the organic farm combine the production of regenerative energy in a sustainable manner with the production of high-quality and healthy food, because they mainly use waste materials, allow varied crop rotations and are very energy-efficient. Plant capacity and use should be in reasonable relation to the area of operation, so that the principle aim, food production, is guaranteed.

Sensible waste heat utilisation and very high overall efficiency are to be aimed at, to achieve greatest energy efficiency.

10.1 Biogas plants on Naturland farms

Biogas plants on Naturland farms are run basically with ecologically generated fermentation materials. Vegetable material from conventional production³, which serves as fermentation material to operate the power plant, is limited to max. 30%. Fermentation materials of conventional origin must comply with appendix 1 of Naturland standards on production (permissible purchased fertilisers and soil improvement agents). If certain conventionally produced substrate components are to be found on the farm at the same time as animal feed in organic quality, then the components from conventional sources must either be denatured (e. g. by adding slurry or manure, covering them with such materials, or similar measures) or be unmistakably identifiable (e. g. dyeing with food colouring, or similar measures). Naturland must be informed of the method chosen beforehand.

Where fermentation materials of more than 0.5 DU/ha/year are used for the operation of the biogas plant, then the delivery of any amount of fermentation substrate supplied which exceeds this value must be documented.

If it is necessary to co-operate with other agricultural operations to operate a biogas plant in order to acquire the necessary amounts of fermentation materials, preference should be given to organic farms.

10.2 Co-operation of Naturland farms with other biogas plants

If it is possible to co-operate with a biogas plant on a local organic farm, this shall take precedence over co-operation with a conventionally run plant.

Where a Naturland farm co-operates with a conventional biogas plant, it is only possible to take back digestate if the original matter came from the Naturland farm (e.g. clover grass). In addition, the conditions stipulated in appendix 1 of Naturland standards on production (permissible fertilisers and soil improvement agents) or B.I.1 (humus management and fertilisation), in particular the maximum amounts allowed, are to be observed⁴.

³ Clover grass resp. grass free of mineral fertilisers and synthetic chemical pesticides is a permissible exception.

⁴ Digestate may only be taken back upon application to and in compliance with Naturland's regulations. Digestate from biogas plants which are run solely on conventional fermented matter or on genetically modified organisms from aggregates or on liquid manure and poultry dung from conventional animal husbandry, is prohibited. It is permissible to take back the nutrient equivalent of fermentation materials supplied with an additional margin of 15%.

III. Social responsibility

The holistic claim of Naturland standards also includes the social treatment of the people who work and live on the operations.

1. Human rights

The basic rights of the people living and working on Naturland operations are respected. They must comply at the minimum with the local legal requirements, respectively the human rights listed in the UN Conventions, the International Labour Organisation Conventions and Recommendations (ILO)⁵, the UN conventions on children's rights⁶ and the United Nations Declaration on the Rights of Indigenous Peoples⁷, should these be more comprehensive.

A product created under conditions violating basic human rights, under gross violation of social justice or infringing indigenous land and water rights can not be traded as a product certified by Naturland.

2. Freedom to accept or reject employment

The operations commit themselves to rejecting forced labour and any type of involuntary work. The operation shall not retain any part of the workers' salaries, benefits, property, or documents in order to force workers to remain on the operation.

3. Freedom of association, access to trade unions

All workers have a right to freedom of association and collective bargaining, and are at liberty to exercise this right.

No one shall be discriminated against because of his or her membership in a trade union.

4. treatment and opportunities

No discrimination on the basis of race, creed, sex, political opinion or membership shall be tolerated. All workers, irrespective of their sex, skin colour or religion receive the same pay and have the same opportunities for work of the same nature and same degree of responsibility.

5. Children's rights

No children shall be employed on operations. Children may work on the farms of their own families or a neighbouring farm provided that:

- the work is not hazardous and endangers neither the health nor the safety of the children
- the work jeopardises neither the educational nor the moral, social or physical development of the children
- the children are supervised by adults while working or have been given permission by a parent or legal guardian

6. Health and safety

All workers, employees and their families shall have access to drinking water, food, accommodation and basic medical care.

The employer is responsible for safety, health and hygiene at the workplace. If necessary, this implies holding training courses for employees to raise their awareness of any dangers at their workplace and of the contents of hygiene standards. Operations with more than 10 workers have to draw up a policy on safety at work and make these available to all employees.

7. Employment conditions

Workers for the purpose of these standards are, besides the permanent workers, also seasonal workers and sub-contracted workers.

⁵ <http://www.ilo.org/declaration/lang--en/index.htm>

⁶ <http://www.ohchr.org/en/professionalinterest/pages/crc.aspx>

⁷ http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf

All operations commit themselves to meeting the following requirements⁸.

7.1 Contracts

All workers receive a written contract of employment describing the basic conditions of employment.⁹ Working conditions and contracts have to be documented by the employer to be verified at any time. The employment contract shall at least define the following: job description, scope and limits of the job, and type as well as amount of remuneration. The employment conditions of all workers have at least to comply with the respective higher of the requirements of national regulations and ILO standards.

7.2 Equal treatment

The different kinds of employment shall in no case result in the unequal treatment of any workers: all workers are considered to enjoy the same rights and working conditions including social benefits and other privileges for work of the same nature and same degree of responsibility (see III.4).

7.3 Wages

Workers shall be paid at least the official national minimum wage currently applicable or the relevant industry standard in processing operations or the wages approved on the basis of collective bargaining, whichever is the higher. Workers shall be paid in cash, or in any other manner of their choice.

7.4 Payment in kind

If they so choose, workers may receive part of their wage in kind for services such as housing, food or others offered by the operation. The value attributed to such deductions shall be fair and reasonable. Compulsive deductions from the minimum wage for such services are not permitted.

7.5 Working hours

To permit flexibility and overtime in the peak season (e. g. harvest), an annual limit of working hours or a mutual agreement on overtime requirements in the peak period is necessary. Such an agreement has to be in line with current national labour legislation and negotiated agreements.

7.6 Social benefits

The employer ensures basic coverage for maternity, sickness and retirement. Operations with more than 10 workers need to make a policy on wages and social security available to all workers.

7.7 Further education

The unit offers its employees the possibility of further education and professional training.

⁸ Naturland may determine that in any one country the legal control of employment conditions and the opportunities for further education offered publicly suffices to ensure compliance with these standards.

⁹ Legally binding contracts (in this particular case not necessarily in writing) are required even for workers not registered. Furthermore, they have to be informed of their rights.

Part B. Special provisions for insect breeding

I. Principles

The breeding conditions for organically produced insects comply with species-specific requirements and are so designed that injuries and diseases can be largely excluded as a consequence of the breeding system. The means of production used in the rearing of the insects, such as the feed, structural elements, cleaning and disinfection agents, need to be approved in line with the following standards. The feed used should preferably derive from by-products or residual materials from organic production or the processing of such products. Wherever possible, the production of feed for direct consumption should be avoided if it competes with food for human consumption (e. g. cereals, soya, vegetables etc.). Excrement resulting from the production of the insects should be spread on organically farmed areas in conformity with conditions applying to permissible nutrient limits. Top priority is to be given to the prevention of diseases and pests by applying suitable hygienic measures.

II. Production

1. Breeding

Breeding and propagation are solely by means of natural reproduction. In doing so, the use of hormones, even from the same species, is prohibited.

2. Source of stock

The insects derive from organic sources. Ideally, the stock should be raised on the production site itself. Where this is not possible (the farm manager has reported this and proved that organic stock is not available), the following conditions apply when purchasing stock from conventional sources:

- For purposes of the initial establishment of stock, non-organic breeding insects may be used, with no limits imposed.
- Where necessary, it is permissible to re-establish the stock of one species of insect by using non-organic breeding insects if external factors have inflicted damage on the original stock. Before doing so, the farm manager must provide written analysis of the causes and the rectifying measures adopted in collaboration with Naturland, in order to determine the best way to avoid a recurrence of the external damage factors.
- Genetically modified (transgenic) organisms and those created by polyploidisation or gynogenesis are prohibited from use as stock.

When acquiring stock, it is important to adopt appropriate measures of hygiene and quarantine to prevent parasites, viruses, spiroplasms and other microbiotic pathogens from being introduced to and spreading through the organically certified breeding facility.

3. Conversion periods

One complete reproduction cycle covers development from the egg to the imago for each species of insect. Every stage of development of subsequent reproduction cycles is qualified as organic provided that all the requirements for organic production as described hereafter are complied with. Non-organic breeding insects attain organic status after laying their first eggs.

4. Management

With respect to stocking density and housing, management must be adapted to the developmental, physiological and natural requirements of each species of insect. Ventilation, dust level, temperature, relative humidity and gas concentration must meet the requirements of the respective species by the installation of the appropriate insulating, heating and ventilation facilities in the building, in the systems used and in the containers in which the insects are kept. Technical meters must be installed to monitor and provide a constant record of such important production parameters as temperature, humidity and CO₂. Measures must be taken to ensure that each species of insect is provided with periods of dark and light corresponding to its diurnal cycle and developmental stage.

In order to avoid incidences of cannibalism, the various stages of development are to be kept in separate containers, where necessary, and especially in the case of the mealworm beetle.

Proper structural elements in sufficient quantity and satisfactory quality are also to be installed appropriate to the respective developmental stage of each species of insect. However, care should be taken that they will not be used by the insects as a source of forage. Furthermore, when installing structural elements attention should be paid that they do not contain any undesirable substances (e. g. plasticisers, preservatives, synthetic pesticides) and none which may lead to contamination (e. g. by substance migration from printing ink).

Any insect boxes used are made of recyclable, food-grade materials. The housing materials and compartments must be kept in a satisfactory hygienic condition in order to safeguard the insects' health.

Measures such as security airlocks and double walls must be taken to prevent insects escaping into the surrounding environment at all stages of their development.

The live transport of insects is only permitted for stocking insects. Transport must be carried out as carefully as possible and distances kept as short as viable. The insects' physiological needs with respect to oxygen level, humidity, temperature and feed are to be met.

Surgical intervention and mutilation such as the trimming of wings or removal of jumping hind legs are forbidden. Care must be taken to avoid causing the insects suffering throughout their life cycle.

Specific provisions apply to keeping particular species of the orders *Coleoptera* (beetles), *Diptera* (flies) und *Saltatoria* (grasshoppers).

4.1 Coleoptera (beetles)

The lesser mealworm (or buffalo worm) *Alphatobius diaperinus* and the mealworm *Tenebrio molitor* are bred on dry substrate which is at the same time their main source of food.

Care must be taken to provide the humidity and temperatures required by these species to create ideal conditions for their development (humidity below 30%, temperatures between 25°C and 35°C). Breeding occurs in half-light or complete darkness.

4.2 Diptera (flies)

The production of larvae of the house fly *Musca domestica* and the soldier fly *Hermetia illucens* occurs on moist substrate created from vegetable by-products and residual materials.

Stocking density should be such that the substrate in the production containers is continuously and completely turned over by the movements of the larvae, to ensure that there are no anaerobic areas. The parent flies deposit their eggs in suitable flight cages or nets. Care must be taken to provide the humidity and temperatures required by these species to create conditions ideal for development (50%-70% humidity, temperatures between 24°C and 40°C).

4.3 Saltatoria (grasshoppers)

House crickets *Acheta domestica*, tropical house crickets *Gryllodes sigillatus* and Jamaican field crickets *Gryllus assimilis* are bred on the basis of vegetable by-products and residual materials in appropriate production containers.

It is necessary to install tiered hiding spots for the adult and emerging insects. The egg depositing trays must be replaced by empty trays every one or two days. In this way hatching can take place in fresh production containers and the necessary size grading operations kept to a minimum. Care must be taken to maintain temperatures between 25°C and 30°C in the breeding containers, with approx. 50% humidity and dim lighting following a rhythm of day and night.

5. Feed

The feed and substrate originate exclusively from organic agriculture (preferably from the farm itself or from growers and/or processors in the same region).

Predominantly vegetable by-products and residual materials from agricultural production or processing by-products (e. g. residual materials from the starch and sugar industry) are to be used.

The ration may contain up to 30% feed derived from conversion to organic agriculture.

Animal products as well as their residual materials and by-products are not permissible as feed.

The feed and substrate are to be used according to the following list of priorities, and application to Naturland to do so must be made as from priority c.:

- a. organic¹⁰ by-products and residual materials;
- b. organic¹⁰ feed;
- c. conventional by-products and residual materials;
- d. conventional feed.

Where organic¹⁰ by-products and residual materials derived from the production of organic foodstuffs or organic¹⁰ fodder are not available, then by-products and residual materials from the processing of conventional foodstuffs and conventional fodder may be used but only upon submitting application to Naturland for permission to do so and subject to observation of certain requirements and limits. Such feed should preferably be acquired from the vicinity of the farm. Proof of regular analysis before use has to be submitted as part of the application procedure to show that using this feed is harmless (with respect to pesticides, mycotoxins, heavy metals, GMOs etc.). A corresponding analyses interval has to be agreed upon with Naturland, depending on the substrate used.

The use of supplements and additives is permissible if they are included in Annexes V and VI of Commission Regulation EC No. 889/2008.

The addition of synthetic stabilisers and synthetic preservatives, growth promoters and synthetic amino acids is not permissible.

In order to avoid cannibalism, feeding has to be ad libitum. Where moist feed is used, special care should be taken that no mould growth occurs.

6. Animal welfare and hygiene

Animal welfare is to be safeguarded first and foremost by adopting preventative measures (such as the best living conditions possible, appropriate stocking densities specific to each species, hygienic conditions). The latter must be guaranteed by drawing up a suitable hygiene management plan which describes the measures taken and establishes a timetable for their regular application. Steps to be taken to avoid diseases and, when they do occur, how to treat them, are also to be set down. The farm is obliged to gather information on suitable prophylactic measures such as the use of probiotic microorganisms or the selection of disease-resistant strains by looking out for correlated traits. The hygiene management plan, which describes all the measures to be adopted throughout the entire reproduction cycle, from the development of the egg to the imago and the killing method, is to be submitted prior to initial certification, agreed upon with Naturland and thereafter regularly revised. The plan must cover:

- responsibilities;
- details of all the schedules and areas of applicability of measures to be adopted throughout the whole production cycle, including the killing method;
- equipment and means of production used.

The business premises as well as the equipment and machines used must be in satisfactory sanitary condition and exhibit a high degree of environmental compatibility. For cleaning and disinfection purposes, preference should be given to physical and mechanical methods. The use of cleaning and disinfection agents must comply with the Naturland standards on production, annex 8.1; separate records are to be kept of the cleaning and disinfection agents used. Should stock ever need to be culled for reasons of animal welfare, the housing unit must be disinfected.

Should animal welfare be at risk or impaired, the stock must be treated immediately once a diagnosis has been made. The affected insects must be kept separately in a different part of the premises. Physical and mechanical methods of treatment are allowed. The use of chemically synthesised allopathic veterinary medical products, antibiotics and other remedies is not even permissible in cases of parasitic infection or of diseases caused by bacteria, viruses or other microorganisms. Priority must be given to the insects' welfare which in the case of illness must be restored by adopting speedy and effective measures. Should infestation of whole populations

¹⁰ Incl. permissible ratios of feed from conversion to organic agriculture

or parts of them by microbial pathogens (bacteria, viruses, fungi etc.) be impossible to stop by means of selection procedures, then the speedy culling of the groups affected prevents contamination of the whole production. The culled insects are to be disposed of in a professional manner (incineration).

7. Killing

Killing must be performed on the premises as quickly and carefully as possible and by the farm itself, to spare the insects unnecessary suffering. This is done by temperature shock in order to bring about a painless death as quickly as possible. Killing may also be performed by deep-freezing the insects at at least -18°C , by superheated steam or boiling water.

The procedure chosen, and the materials used must at all events be guided by the needs of each species of insect (e. g. particular sensitivity to temperatures or stress). The equipment used may not harbour any risk of injury to the insects.

8. Processing

The principles for the processing of insects are described in Part C. General Standards for Processing of the currently valid Naturland standards for processing.

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