Module 9
Crop Production Standard

Incorporates:

- Fresh and processed vegetables
- Arable and seed crops
- Herbs
- Flowers
- Annual fruit crops, e.g. strawberries

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This document replaces the BIO-GRO New Zealand Organic Standards, 30 April 2001: Module 4.2

The reasons for change are:

- regular review required under IFOAM accreditation;
- incorporation of notified changes since the 30 April 2001 Standards were published;
- incorporation of other changes required for ongoing compliance with the IFOAM Basic Standards, the NZFSA OOAP, and overseas market regulations;
- organic production systems are continuously evolving.

This document may be altered at any time. It was current at the date in the header of each page of the document. It is recommended that anyone intending to use this document contact BioGro or check the BioGro website www.biogro.co.nz to confirm that this is the current version.

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1 Scope and purpose

This BioGro Standard contains the production requirements and audit criteria for the certification and licensing by BioGro of producers of fresh and process vegetables, arable and seed crops, herbs, flowers, and annual fruit crops, e.g. strawberries, to use the BioGro trademarks and logos.

This BioGro Standard specifies the production requirements and audit criteria that must be met by:

- producers of organic crops certified by BioGro; and
- producers of organic crops licensed by BioGro to use the BioGro trademarks and logos.

All crops bearing the BioGro trademarks/logos are produced in compliance with this Standard.

Information on BioGro, applying for certification, and the use of the BioGro trademark/logo can be obtained from *Module 1 Introduction* and *Module 3 Certification System*. Information on the BioGro requirements for processing and distribution of organic produce can be obtained from *Module 13 Processing Standard* and *Module 14 Distribution Standard*.

The audit checklists (available on request from BioGro) may be used for self-audits in preparation for audits by BioGro.

2 Definitions

The BioGro definitions of terms can be found in the BioGro Standards *Module 2 Glossary of Terms*.

3 Production specifications

This section specifies the guiding principles, recommendations and requirements of the BioGro Standard for certified organic crop production.

3.1 Soil and fertility

3.1.1 Guiding principles

Organic crop production systems must aim to sustain and enhance the fertility and life-supporting ability of the soil, including its biological, physical and chemical components. Emphasis must be placed on the importance of soil organic matter, soil flora and fauna and on achieving cycles and flows of nutrients and organic matter that will conserve and enhance soil fertility and humus.

3.1.2 Recommendations

a. Soil organic matter and soil structure are of paramount importance, and should be maintained and enhanced by using any or all of the following:
   i. composts and mulches;
   ii. the cultivating under of crop residues;
   iii. green manure crops;
   iv. mixed leys including deep rooting and leguminous species;
   v. grazing by livestock;
   vi. suitable crop rotations; and
   vii. sympathetic cultivation techniques.

b. For intensive cropping systems the use of compost is highly recommended but must be managed carefully to ensure that neither storage nor use leads to pollution of soil or water by leaching.

c. Green manure cropping is recommended as an important practice to maintain and enhance the overall fertility of cropping soils.

d. Restorative systems based on the rotation of grazed pasture leys and the growing of crops are recommended for extensive crop production systems.

e. Grazed pasture from a well-composed ley will assist in building a well structured and nitrogen rich soil and help mobilise soil nutrients for the following crops.

f. Good management of pasture will aid in building up soil organic matter and improving soil structure.

g. Cultivation techniques should involve minimal tillage in order to minimise damage to soil structure and to avoid soil compaction.

h. Grazing and ranging by livestock such as cattle, sheep, pigs, and poultry, should be managed in ways that enhance soil structure and fertility.

i. Mineral, foliar and liquid fertilisers should be regarded as supplementary to, not a substitute for, nutrients cycled via organic matter return. Note that mineral fertilisers allowed by BioGro generally require assimilation by soil or compost organisms before the nutrients are assimilable by plants.

3.1.3 Requirements of the Standards

a. **Soil testing**

Regular soil testing, as specified below, is required to:

   i. monitor fertility levels to ensure that the overall fertility of cropping soils is maintained and enhanced; and/or
   ii. determine whether mineral supplementation is necessary and appropriate; and/or
   iii. determine the need for restricted fertilisers.

Herbage/foliar testing may also be used to evaluate the need for nutrients such as trace minerals, but is not an alternative to soil tests.

Soil test(s) from at least one productive area on the farm are required annually for C0, C1, and C2 properties. Annual tests thereafter are not obligatory, but may be required at the auditor's discretion if there are concerns regarding fertility levels.

Soil and herbage/foliar testing must be carried out under an ISO 17025 accredited laboratory test, where available. If an ISO 17025 accredited laboratory test is not available for that type of test, then BioGro written approval for the test to be carried out is required for acceptance under these standards.

b. Organic matter
Soil tests must always include tests for organic matter levels.

c. Soil health
After the commencement of organic management, measures of biological fertility and soil structure must show either good or generally improving levels of these soil parameters. This must be achieved by, where appropriate:

i. cultivation of legumes, green manures or deep-rooting plants in an appropriate multi-annual rotation programme; and/or
ii. addition to the soil of composts (refer d below) or other allowed organic material. BioGro may place limits on the quantities being applied.

d. Composts and Vermicasts
Composts and vermicasts may be made on the farm or purchased from BioGro certified/approved sources. Composts and vermicasts made on the farm must be made from ingredients sourced from certified properties and/or ingredients selected in compliance with the *BioGro Compost Guide*. Compost made on the farm must have heated, been aerated and mixed, matured sufficiently, and have been produced in compliance with the requirements of the *BioGro Compost Guide*. Vermicasts made from low risk ingredients approved by BioGro do not have to go through a heat process.

Management of composts must comply at all times with the requirements of the local authority.

e. Leaching
Leaching losses from stored and applied composts must be actively minimised.

f. Nitrogen rates
Application rates of compost along with other fertiliser additions must not lead to excessive levels of available nitrogen. Nitrogen applied through the use of approved composts and foliar fertilisers should be no more than that required for the current crop, and as a guide should not exceed 170 kg nitrogen per hectare per year.

g. Raw manures
With the exception of a certified property's own dairy or pig effluent from the certified area and certified livestock, raw animal manures must not be applied directly to soils. Raw animal manures (including those from the certified property if collected) must be hot composted before use, refer to the *BioGro Compost Guide*.

h. Sewage by-products
Sewage sludge or bio-solids are prohibited and must not be applied directly, or used as an ingredient in composts.

i. Industrial by-products
Food and textile industry by-products of biodegradable material, i.e. of microbial, plant, or animal origin, free of synthetic additives, may be used provided they are hot composted, refer to the *BioGro Compost Guide*.

j. Mulches
Where available, mulch materials must be sourced from certified farms. If certified mulches are not available, mulches from conventional sources may be used subject to the following:

i. they must not have had any prohibited substances applied directly to them; and
ii. documentation must be obtained from the producer to confirm this; and
iii. they must have approval prior to purchase; and
iv. residue tests may be required.

k. Seeds, seedlings and vegetative propagative materials:
Certified organic seeds, seedlings or vegetative propagative materials for green manure crops must be sourced in compliance with section 3.3.3 b. of this Module.

l. Genetic engineering
Genetically engineered varieties and seeds, pollen, transgene plants or plant material are expressly prohibited.

m. Green manure crops and crop residues

i. Green manure crops and crop residues must be managed to maintain and enhance the overall fertility of cropping soils as evidenced by soil nutrient tests, soil organic matter tests, and evaluation of biological fertility.
ii. In intensive cropping systems green manures and crop residues must by preference be cultivated under, not grazed or baled off, unless soil tests are showing satisfactory fertility or the crop residue is difficult to manage, e.g. linseed. Baled-off green manures and crop residues must be retained for use on the farm unless their being moved off the farm is accounted for in the fertility and crop rotation plan specified in section 3.1.3 n below.
iii. Crop residues such as straw must not be burnt, except with prior written approval from BioGro. Approval will only be given in exceptional cases, such as for disease control.

n. Fertility and crop rotation plan
The farm must have a documented fertility and crop rotation plan that covers, at least, the next two seasons. Cropping rotation and restorative phases must be planned so that the overall fertility of cropping soils is maintained and ideally enhanced.

o. Soil structure
Damage to soil structure and soil compaction during cultivation must be minimised by using appropriate equipment, machinery, and timing. Any soil structure damage due to cropping practices must be offset elsewhere in the rotation by positive practices that build soil structure, e.g. green manure crops.

p. Biological activiators
The following biological activators are allowed providing the product formulations are certified/approved by BioGro:

i. bio-dynamic preparations; available from the Bio-Dynamic Farming and Gardening Association and other BioGro certified/approved suppliers;
ii. microbial activators; and
iii. plant-based preparations.

q. Permitted fertilisers
Refer *Appendix B*.

r. Restricted fertilisers
Refer *Appendix B*.

s. Fertiliser supply
Fertilisers should be obtained from a BioGro certified/approved supplier where available locally. If not, then every effort must be made and documented to ensure that any brought-in materials comply with all requirements of the BioGro Standards. If fertilisers are not obtained from a BioGro certified/approved supplier then particular attention must be paid to potential contamination from the source or during storage or transport by prohibited fertilisers, heavy metals, pesticides, animal health remedies, and other prohibited materials.

t. Liquid fertilizers including vermicast liquids and compost teas
Liquid fertilisers may be made on the farm or BioGro certified/approved products can be used. If liquid fertilisers are made on the farm then evidence must be provided that all ingredients comply with the requirements of this Standard and are not contaminated with prohibited materials.

u. Sewage
Manures and composts containing human excrement i.e. faeces and urine are prohibited, and may not be brought onto the property or used as a compost ingredient.

v. Miscellaneous fertilisers
All other materials for fertilisation and soil conditioning must be certified/approved by BioGro prior to use, refer *Module 22 Procedure for Evaluation of Inputs*.

w. Thermal sterilisation
Thermal sterilization of soils to combat pests and diseases is restricted and must have BioGro's written approval prior to use.

x. Burning Vegetation
Land preparation by burning vegetation must be restricted to the minimum.

y. Salinization
Relevant measures must be taken to prevent or remedy soil and water salinization.

3.2 Water supply and irrigation

3.2.1 Guiding principles

Water is regarded as a scarce resource. Careful management of irrigation is required to enhance the quality of both the soil and crops, whilst minimising any potential adverse effects on the environment.

3.2.2 Recommendations

a. Water sources should be chosen to ensure adequate supplies of uncontaminated water, and where necessary water purity tests should be carried out.
b. Irrigation systems should be chosen which
   i. provide sufficient water to satisfy soil and crop needs only; and
   ii. avoid over-watering, leaching, or water-logging; and
   iii. ensure the taking of this water does not cause adverse effects on any associated surface or groundwater ecosystem.

3.2.3 Requirements of the Standards

a. Water source purity
Where there is potential contamination, e.g. the catchment area includes conventional horticulture, then proof must be provided annually that irrigation water is not contaminated with any restricted or prohibited materials. Refer *Appendix A: Residue Levels in Certified Products, Water, Soil and Composts*.

b. Catchment
Information must be supplied to BioGro describing the catchment area and detailing any likely contamination of water sources with prohibited materials.

c. Optimal watering
Irrigation systems must be efficient and effective in supplying farm needs. Soil and crops must not exhibit signs of excessive irrigation, namely over-watering, leaching or waterlogging.

d. Monitoring water
Optimum water use strategies must be demonstrated and supported by an appropriate method of monitoring.

e. Regional plan and resource consents
Water supplies and usage must meet the requirements of the Regional Plan, and where required have a current resource consent.

f. Temporary irrigation systems
Temporary irrigation systems, such as plastic driplines, must be removed after use.

3.3 Seeds, varieties, transplants, and crop management

3.3.1 Guiding principles

Good yields of high quality crops will be produced with minimal external intervention where crop types, varieties and strains are grown that are best suited to the region, the property, and organic production, and also where positive organic management systems are in place.

3.3.2 Recommendations

a. Select crop types that best suit the region and the farm.
b. Select varieties that best suit organic production and minimise the likelihood of weed, pest and disease problems.
c. Where available, use organically grown seed and plants.
d. Select strains that are suited to organic production and where selection for resistance and tolerance to disease has been carried out.

3.3.3 Requirements of the Standards

a. Plan to trial alternatives
If weed, pest or disease problems are prevalent on the farm then there must be a documented plan to trial alternative crops and varieties that have resistance and tolerance to those problems.

b. Seeds, seedlings and vegetative propagative materials:
Certified organic seeds, seedlings or vegetative propagative materials must be used where available.

i. If certified organic seed or vegetative propagating material is unavailable, then seed and vegetative reproductive material may be taken from a mother plant (in the case of seeds) and a parent plant (in the case of vegetative propagating material) which have been produced under certified conversion to organic production for at least one generation, or in the case of perennial crops, for two growing seasons.

ii. If neither full or conversion seeds, seedlings or vegetative propagative materials are available then conventional sources may be used provided they are not treated with any prohibited materials and the supplier has provided a written guarantee to confirm this.

iii. Seed treated with prohibited materials cannot be used unless prior written approval has been received from BioGro. If a certified grower is unable to source untreated seed for the required varieties and wishes to use treated seed then they must apply in writing to BioGro for prior written approval. Written documentation must be supplied for:
- evidence of the unsuitability of other varieties;
- evidence of the unavailability of untreated seed;
- the cleaning procedure which will be used for the treated seed.

Note that seeds treated with prohibited materials can not be used under any circumstances for some export crops.

iv. Genetically engineered varieties are expressly prohibited.

c. Seedlings

Seedlings and other vegetative materials must have been grown in BioGro certified/approved potting mixes in BioGro certified/approved facilities.

d. Thermal sterilisation

Thermal sterilisation of potting mixes requires prior written approval from BioGro.

e. Pollinaton

Beehives sited on the certified property, or brought onto the certified property for pollination of crops or other purposes, must not normally contain prohibited treatments for pests and diseases, refer *Module 7 Honey and Bee Products Production Standard* and *Appendix B: Permitted and Restricted Materials and Practices* for allowed treatments. If the allowed treatments will not give adequate control of varroa mite then hives brought onto the certified property specifically for pollination of a crop(s) and for a limited period of time to cover the flowering period only, may contain prohibited treatments for varroa mite.

f. Seed and Plant Material

Seed and plant materials must be propagated under organic management one generation in the case of annuals, and for perennials two growing periods or 12 months, which ever is the longer, before being certified as organic seed and plant material.

g. Treated timber

Use of timber treated with arsenate and/or other prohibited materials is a restricted practice and requires BioGro written approval. All alternatives must be evaluated first.

Note that properties producing certified products to be exported to US (including products which will be ingredients of processed products to be exported to US) must comply with the USDA National Organic Program (NOP) requirements for treated timber.

3.4 Weed management

3.4.1 Guiding principles

Organic crop production systems should be designed to minimise the need for intervention to control weeds while ensuring that weed competition does not significantly reduce yields or crop quality.

Cultivation and soil disturbance should be minimised while still obtaining adequate weed control.

3.4.2 Recommendations

a. Weed control depends on timely and appropriate management techniques, including some or all of the following:
   i. rotations;
   ii. selection of optimum planting dates with respect to crop choice, lunar cycles and weather patterns;
   iii. avoiding letting weed plants go to seed in previous crops;
   iv. grazing of livestock;
   v. introduction of biological controls;
   vi. use of BioGro certified/approved bio-dynamic preparations;
   vii. allelopathic green manure crops;
   viii. stale seed beds;
   ix. the use of mechanical, hand or thermal methods;
   x. mulches; and
   xi. competition from the crop or under-sowed species.

3.4.3 Requirements of the Standards

a. Weed management plan
If weed problems are prevalent on the farm then there must be a documented plan to remedy these problems.

b. Biological control
Biological control agents may be introduced. BioGro certified/approved bio-dynamic peppers are permitted.

c. Mechanical and thermal weed control
Mechanical and thermal weed control techniques, such as flame weeding, are permitted. Cultivation of bare soils for weed control must be minimised in order to protect those soils.

d. Plastic and reflective mulches
Plastic mulches are permitted, but must be retrieved after use, and must not be burnt. Only plastic products based on polyethylene, polypropylene and polycarbonates are allowed.

e. Mulches
Mulches from conventional sources must be approved by BioGro prior to use, refer section 3.1.3 j. of this Module.

f. Herbicides
Chemical/synthetic herbicides are expressly prohibited.

g. Solarisation
Solarisation to control difficult perennial weeds is a restricted practice and requires prior written approval from BioGro.

3.5 Pest and disease management

3.5.1 Guiding principles

Internal balance and stability of an organic system will be achieved by fostering the beneficial processes and interactions that occur in natural ecosystems, thereby minimising reliance on external control measures.

Pest control in organic production depends on building an environment based on a natural balance through establishing floral and faunal diversity.

Organic crop production systems should be designed to minimise the need for intervention to control pests and diseases while ensuring that pest and disease damage does not significantly reduce yields or crop quality.

Inputs used for pest and disease management should work in conjunction with natural cycles rather than trying to dominate those cycles.

Deleterious environmental effects of particular management practices must be minimised, including any that may reduce the natural diversity to the detriment of plant and wildlife habitats.

3.5.2 Recommendations

a. Minimise pest and disease problems by creating a healthy soil, encouraging beneficial fauna, and using good husbandry practices.
b. To reduce the likelihood of disease problems, select crops, varieties, and strains that best suit organic production, the region, and the farm.
c. Protect and encourage the natural enemies of pests through provision of favourable habitats, i.e. hedges, shelterbelts, rough grass areas, nesting sites etc.
d. Build an environment based on a natural balance through establishing floral and faunal diversity.
e. Where intervention is required, the use of introduced biological controls should be used in preference to permitted or restricted sprays provided pest presence levels meet market and export phytosanitary requirements.

3.5.3 Requirements of the Standards

a. Pest management plan
The documented pest management plan for the farm must be based on biological control through encouragement of a natural balance and where required the introduction of predators and parasites.

b. Resistant varieties
If disease problems are prevalent on the farm then there must be a documented plan to trial alternative crops and varieties that have resistance and tolerance to those diseases.

c. Preventative management
Crop management systems must be designed to reduce the likelihood of pests and diseases.

d. Habitats
Suitable habitats, such as beetle banks and non-cropped strips, for the natural enemies of pests must be present on the farm.

e. Mechanical controls
Mechanical controls, e.g. traps, barriers, sound scares, lures, etc., are permitted.

f. Permitted materials
Refer *Appendix B*

g. Restricted materials
Refer *Appendix B*

h. Prohibited materials
All synthetic pesticides not listed as allowed in these Standards are prohibited.

i. Thermal sterilisation
Thermal sterilisation of potting mixes and soils requires prior written approval from BioGro.

3.6 Harvesting, packing, storage and transport

3.6.1 Guiding principles

Crops should be harvested in ways that protect the cropping soils.

All stages of harvesting, packing, storage and any transportation must be managed to ensure maintenance of the crop's organic integrity.

Crops should be harvested, packed and stored in ways that will maintain maximum nutritional value.

3.6.2 Recommendations

a. Harvest in a way that minimises damage to soil structure.
b. The organization of harvesting and post harvest management must protect the crop's integrity to maintain and enhance the value of the BioGro trademark. The storage and transport of produce must ensure no contamination by or mingling with uncertified produce and/or restricted or prohibited materials.
c. Vegetables and fresh herbs should be harvested, packed and stored in ways that will maintain maximum freshness and nutritional value. Relevant industry best practice codes for harvesting and handling should be complied with.
d. Grains should be stored in ways that retain maximum nutritional value and minimise losses to pests, vermin, and other storage problems.

3.6.3 Requirements of the Standards

a. Harvesting
Containers, gloves, harvesting equipment, and machinery used for harvesting certified crops should be dedicated to organic use only. If machinery is also used for harvesting conventional crops then it must be cleaned according to a BioGro approved procedure prior to entering the certified area. The cleaning must ensure that:
i. certified produce can not be contaminated; and
ii. plant material and soil from a conventional property are not brought onto the certified property.

b. Staff awareness
All harvesting staff must be aware of the need to maintain the integrity of certified organic produce and following agreed procedures to ensure this.

c. Burning of crop residues
Burning of crop residues can only be done with prior written approval from BioGro. Approval will only be granted in extreme cases, such as for disease control.

d. Cleaning
Any washing, packing, and processing of crops must be in:
i. equipment dedicated to organic crops; or
ii. equipment that has been cleaned according to BioGro approved procedures and cleaning materials since the last use for uncertified crops or crops of different certification status.

If cleaning by hand is insufficient, then air-blasting, water-blasting, steam cleaning, or flushing with potable water, will be required. Where necessary flushing with a sacrificed portion of the crop may also be required

e. Washing water

Water used for washing produce must be of potable quality.

f. Grain drying

If grain requires drying to bring the moisture content below acceptable levels then this should be done immediately after harvest, with indirect heat.

The moisture content must be kept below these levels during storage to ensure food safety requirements are met.

g. Storage

Produce in storage must be protected from contact with all prohibited and restricted materials Where uncertified produce or produce of different certification status is also stored there then:

i. containers must be clearly marked as organic with the certification status of the produce; and
ii. segregation from uncertified produce or produce of a different certification status must be guaranteed; and
iii. staff must be aware of the organic status and the certification status of the produce and following agreed procedures to ensure the above.

h. Permitted pest control materials

The following pest control methods are permitted for packing and storage facilities:

i. high pressure water;
ii. controlled atmosphere, e.g. airtight silo with carbon dioxide or nitrogen;
iii. quick-freezing;
iv. heat treatment; and
v. forced air circulation.

i. Restricted pest control materials

The use of pyrethrum is restricted and must have prior written approval by BioGro. The use of permitted pest controls above must be fully explored before the use of pyrethrum can be considered. Pyrethrum products used can not contain the synergist piperonyl butoxide.

j. Rodent control

Prior approval must be obtained from BioGro for use of chemical/synthetic materials. This must be by the use of bait stations, and the bait stations must be outside food handling areas.

k. Transportation

During any transport of produce away from the certified area its integrity must be protected:

i. Where there is a risk of airborne contamination then containers must be sealed or covered or transported in enclosed or curtain-sider vehicles.
ii. Containers must be clearly marked as organic, and labelled with the grower's name and BioGro number, and the name and organic status of the produce.
iii. Segregation from uncertified produce and produce of a different status must be guaranteed.
iv. Drivers and staff involved in loading and unloading must be aware of the importance of the organic integrity of the produce.

l. Parallel production

Where parallel harvesting, storage and transport occurs special attention must be directed to:

i. The identification of certified produce to distinguish it from produce that is uncertified or of different certification status using such things as different colour bin cards.
ii. The separation distances between certified (including between produce of different status) and uncertified produce.
iii. The keeping of records to enable traceability.
iv. Staff awareness of the need to maintain the integrity of the certified produce.

m. Packaging

Packaging must:

i. be materials that will prevent contamination of the product;
ii. use compliant labelling;
iii. protect the contents from damage; and
iv. optimise the ongoing quality of the produce.

Packaging must comply with the requirements of *Module 14 Distribution Standard* Section 4.5.1.

n. Distribution and retail

Licensees responsible for distribution and/or retailing of their own produce must ensure that the produce is correctly labelled in compliance with *Module 3 Certification System* sections 4.3.1, 4.4.1, 4.5, 7.8, and *Module 14 Distribution Standard* section 4.8.2.

3.7 Container growing systems

Land-based organic food production is based on growing plants in biologically active soil, on the premise that healthy soil will produce healthy plants, healthy animals, healthy food, and hence healthy people.

Soil-less hydroponic growing systems can not be considered for certified organic production.

Growing systems based on containers, and using BioGro certified/approved composts and certified/approved liquid fertilisers, and which demonstrate adherence to the basic principles of organic food production, and which are considered by BioGro to be sustainable, can be considered for certified organic production at BioGro's discretion.

Timber treated with prohibited materials can not be used for containers for growing, and can not be used for garden beds.

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