

C: CROP PRODUCTION (310 CLAUSE 5)

CANADIAN ORGANIC STANDARDS*

“Clause 8.4 on Transport applies to the transportation of plants and harvested crops.”

5.1.1 “This standard shall be fully applied on a production unit for at least 12 months before the first harvest of organic products.

Prohibited substances shall not have been used for at least 36 months before the harvest of an organic crop.”

5.1.2 “When new production units are added to an existing organic operation, the operator shall provide records to show that prohibited substances have not been used for at least 36 months (see 5.1.1) and verification shall be conducted before the first harvest of products from this new production unit.

NOTE: Part 13 *Organic Products of the Safe Food for Canadians Regulations* requires that the application for the organic certification of crops grown in fields, gardens or pastures be

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5.1.1 “Fully applied” means an Organic Plan is submitted to an organic certification body, which reviews and approves the Organic Plan. The plan should demonstrate the lack of use of prohibited substances and outline the operation’s best management practices. There needs to be a minimum of at least 12 months after that initial approval and before the first harvest to allow for further oversight and inspection by the certification body and its inspector. “First harvest of organic products” refers not only to crops that are marketed but also includes harvest of feed crops for the operation’s livestock and consumption of pasture or forage by livestock. Note that details on raising livestock can be found in Clause 6.

The initial application form for organic certification is usually considered to be, or includes, the Organic Plan. Production units listed on a valid certificate under one operator do not need further transition time when transferred to a new owner. The certification body must be informed about the change in ownership to ensure a seamless transfer, otherwise future crops may lose their organic status. To ensure organic integrity is ongoing under the new owners, a certification body may schedule additional inspections.

If there is an accidental use, application or leak of a prohibited substance, the area where this occurred must go through a 36-month transition, in which there must be an 8-metre buffer separating the area from organic crops. For example, if treated seeds were planted accidentally, the plants would need to be killed (e.g., by mowing or tilling) once the error was realized; the 36-month transition would then begin.

5.1.2 Land can be added to an existing organic operation without further transition provided no prohibited substances have been applied in the last 36 months and there is documentation/records to substantiate the claim.

The added fields must be inspected prior to the first organic harvest, and again with the rest of the operation in each year of organic production.

Note: If the operator is applying for certification for the first time, 5.1.2 requires the operator to apply for certification 15 months before the expected sale date of organic crops. The 15-month period allows time for pre-

*Organic production systems: general principles and management standards. CAN/CGSB-32.310-2020. Canadian General Standards Board. Dec. 2020. www.publications.gc.ca/site/eng/9.854643/publication.html.

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filed at least 15 months before the day on which the food is expected to be sold. During that period of time, compliance with this standard will be assessed by the certification body and this assessment must include at least one inspection of the production unit, during production, in the year before these crops may be eligible for certification and one inspection, during production, in the year these crops are eligible for certification.”

5.1.3 “The operation shall aim at a complete transition of its production. During the transition period, the operation can maintain, in addition to the production in transition, a non-organic system of production (split operation) that shall be entirely separate and identified separately, pending its incorporation into the overall transition process.”

5.1.4 “The operation can be converted one production unit at a time, and each converted production unit shall respect the requirements of this standard. The exception to this norm, parallel production, is only allowed in the following cases:

- a) annual crops harvested during the final 24 months of the transition period when fields are added to existing operations;
- b) perennial crops (already planted);
- c) agricultural research facilities; and

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inspections and time for the operator to adjust the Organic Plan if necessary. This 15-month minimum requirement is applicable to all first-time applicants even if the land has not been recently treated with prohibited substances (e.g., hayland, native pasture or abandoned farmland).

5.1.3 The intent is as stated – that the entire operation aim (through planning) to become organic. In the enforcement of this requirement, there is the understanding that this:

- does not intend to prohibit non-organic production for home use;
- applies to all crop production (which includes forage and pasture) and in-ground greenhouse production. It does not include product preparation or any of the following specialty production systems (apiculture, maple, mushroom, sprouts/shoots/microgreens, containerized greenhouse, wild crops, insects).

When making this decision, certifying bodies investigate the intent of the operators. Do they have a plan to transition their whole crop production to organic production? If not, do they have a credible excuse? Without a credible reason to maintain non-organic production, the split operation cannot be maintained indefinitely; eventually, the standard must be enforced.

5.1.4 The goal is to transition the entire operation to organic production. Split operations have an organic and a non-organic component. This is allowed provided the following conditions are met:

- The crops are visually distinguishable. For example, organic clear-hilum soybeans can be grown on a farm that also produces non-organic, brown-hilum soybeans. An orchard can grow organic Gala apples and non-organic McIntosh.
- The components are entirely separate, in name and in reality.
- A transition plan is in place for the non-organic component unless there is a credible reason for not transitioning.

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d) production of seed, vegetative propagating materials and transplants.”

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Parallel production means growing crops that look the same on both organic and non-organic land at the same time. Parallel production is not permitted except under certain conditions (which are described below) due to concern about accidental commingling of organic and non-organic products and concern that fraud would be more difficult to detect if parallel production was allowed.

- It is not parallel production if the crops can be distinguished by the average person. For instance, growing a beefsteak tomato on organic land and a cherry tomato on non-organic land in the same year is not parallel production.
- Growing two different but similar-looking cherry tomatoes, one on organic land and one on non-organic land in the same year is parallel production. If the cherry tomatoes did not look similar, for example, if one was red and one was yellow, this would not be parallel production.
- Growing hard red spring wheat on non-organic land and Kamut on organic land in the same year is not parallel production. However, growing two different varieties of hard red spring wheat that look the same, one on organic land and one on non-organic land, in the same year is parallel production.

Another issue is timing. In annual cropping, parallel production means growing the crops in the same growing season. Growing, for example, Kamut on organic land in one year and on non-organic land in the following year is not parallel production.

For shorter season crops, like lettuce, this becomes more complicated. For instance, early in the season, growing butterhead lettuce on organic land and Romaine lettuce on non-organic land is not parallel production. Growing butterhead lettuce on organic land early in the season and growing butterhead lettuce on non-organic land late in the season is not parallel production, provided that early and late season lettuce crops do not overlap.

The following is an excerpt from an article by the Organic Federation of Canada. See organicfederation.ca/sites/documents/200817%20InfoBio%20ENG.pdf.

Whenever the standard has been revised, the issue of parallel production has been hotly debated. The subject was discussed in the 2020 revision work and again there was a

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fierce debate. The 2015 arguments to allow parallel production were brought back in the discussions of the Crop Working Group, including the following:

- Canadian producers are at a disadvantage compared to U.S. producers who are permitted to produce identical organic and non-organic crops;
- the production of annual crops is one of the few types of production for which parallel production is prohibited (it is permitted for perennial crops, in livestock production, in the preparation of organic food, etc.); and
- producers can circumvent the prohibition by creating separate legal entities and the certification body cannot then supervise the production of the separate non-organic holding.

However, others expressed their concern that allowing parallel production could lead to non-organic products being sold as organic, due either to fraud or accidental mixing of products.

Parallel production is allowed only under specific circumstances, listed in 5.1.4 and 5.1.5.

- Perennial crops (already planted) including perennial vegetables (e.g., asparagus), trees, shrubs, perennial forage and pasture, etc.
- Research facilities are allowed to be certified organic with parallel production to ensure that organic research can take place, including comparisons between organic and conventional production methods.
- The rationale behind the exemption for seeds is that seed houses also might not expand their organic offerings if there is not an allowance for parallel seed. This does not mean that a farmer who grows a crop that is harvested for seed can access parallel production. Only seed companies are eligible.

In 2020, the Technical Committee added a new exception. In subclause 5.1.4, for existing organic farms, parallel production is allowed during the last 24 months of the transition of land added to the farm. Consider, for example, a certified organic grain farm that increases its acreage by renting a neighbouring non-organic field. During the first transition year of the leased field, the organic farm must grow crops that are visually distinguishable from organic crops. For example, six-row barley can be planted in the field in transition while two-row barley is grown in the organic field. During the last 24

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5.1.5 “The following special conditions shall be observed for parallel production:

- a) The operator shall clearly demonstrate that the identity of the crops produced in this manner can be maintained during their production, harvesting, storage, processing, packaging and marketing;
- b) The operator shall maintain verifiable, accurate records of both non-organic and organic produce and product storage, transportation, processing and marketing.

NOTE: Parallel production crops, both organic and non-organic, are inspected just prior to harvest and an audit of all parallel production crops occurs after harvest.”

5.1.6 “All production units shall have distinct, defined boundaries.”

5.1.7 “Production methods shall not alternate between organic and non-organic on a production unit.”

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months of transition, the farmer will be able to grow identical crops on both the organic fields and the fields in transition. However, it is essential that the crops are completely separated at harvest and storage. Meticulous records must be kept. The transitional crop is considered and sold as non-organic. In addition, the transition plan must be described in detail in the organic plan.

5.1.5 Post-harvest operations are not subject to the prohibition on parallel production. For example, seed cleaning plants may process both organic and non-organic seeds provided that there are systems in place to protect organic integrity.

Good record keeping is required to maintaining identity of crops through storage, processing, packaging and marketing. Although the products are visually distinct on the farm, that distinction may be lost during processing. For example, it is easy to distinguish between a red-skinned and yellow-skinned apple, but the applesauce made from them might look the same.

5.1.6 Organic crop fields and pastures must be distinguishable from neighbouring fields and pastures. For example, maps may indicate GPS coordinates of boundaries, or farmers can install fences, use hedges, roadways, mowed areas, etc.

5.1.7 Deliberately switching between organic and non-organic production is prohibited. It would result in decertification of the affected field or possibly the entire operation, and refusal to accept a reapplication. CBs may approve situations where the loss of certification was beyond the producer's control (for example, the mandated use of a prohibited substances by authorities, spray drift of a prohibited substance, natural disaster, or financial failure) or where there are personal issues (for example, the death of a family member, divorce, or inter-generational transfer).

If certification lapses, the rules for new operations apply: 36 months is required between the last use of prohibited substances and the first organic harvest, and the operation is required to be under organic supervision for a minimum of 15 months.

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5.2.1 “Measures shall be taken to minimize the physical movement of prohibited substances onto organic land and crops from:

- a) adjacent areas;
- b) equipment used for both organic and non-organic crops.”

5.2.2 “If unintended contact with prohibited substances is possible, distinct buffer zones or other features sufficient to prevent contamination are required:

- a) buffer zones shall be at least 8 m (26 ft 3 in.) wide;

- b) permanent hedgerows or windbreaks, artificial windbreaks, permanent roads, or other physical barriers may be used instead of buffer zones;

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To keep the transition time to the minimum 15 months, lapsed farmers need to maintain documentation that shows that the farm management was in compliance with the standard in the years without certification.

5.2.1 Movement of prohibited substances from neighbouring fields, roads, waterways, etc. should be minimized. See 5.2.2 for suggested methods of minimizing the risk of movement.

Equipment used on organic land should be well-maintained to avoid leaks and spills. If equipment is used on non-organic land, it must be adequately cleaned to prevent seed or prohibited substances from spreading to the organic land.

5.2.2 Organic farms must be proactive and work towards minimizing contamination especially when neighbouring land is used in ways not conducive to the organic status of an operation.

Certifying bodies should develop a risk assessment tool. This can be as simple as a list of questions asked by the inspector.

- Is it likely that the neighbour is using prohibited products that would contaminate organic crops? For example, a horse paddock next to an organic farm provides little risk of contamination in contrast to a conventional orchard.
- Is there a busy highway next to the organic farm? What is the distance from the highway to organic farming activities?
- Is there a source of airborne contamination (e.g., jet fuel, sour gas plant) close by, but not adjacent?
- Are there prohibited fence posts or wood? If yes, where (paddocks, trellis infrastructure, feed bins, in-ground greenhouse foundations)? When were they installed and by whom? Refer to 5.2.3 for more details.
- Are genetically engineered crops grown next to or close to organic crops? If yes, refer to 4.4.4 and 5.2.2 d).

Buffers are also required if there is an accidental spill or leak of a prohibited substance which has the potential to contaminate surrounding organic crops. The area would also require a 36-month transition.

5.2.2 b) A buffer zone (8 metres or more in width) is one of several ways to prevent contamination. Other physical barriers can be used.

Buffer zones are measured from the edge of the treated crop to the organic crop. This detail is significant particularly

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c) crops grown in buffer zones shall not be considered organic whether or not they are used on the operation;

d) crops at risk of contamination from commercialized GE crops shall be protected from cross-pollination. Mitigation strategies such as, but not limited to, physical barriers, border rows, strategic testing or delayed planting shall be implemented unless generally accepted isolation distances for the at-risk crop type are present (see Note below).

NOTE: Generally accepted isolation distances for crops at risk of contamination from commercialized GE crop types include: soybeans—10 m (33 ft); corn—300 m (984 ft); canola, alfalfa (for seed production) and apples—3 km (1.8 mi.).”

5.2.3 “Untreated wood or wood treated with substances listed in Table 4.2 (Column 2) of CAN/CGSB-32.311 are permitted, such as for fence posts.

a) For new installations or replacement purposes, fence posts or wood treated with prohibited substances are prohibited. Alternatives, such as metal, plastic, concrete or protective sleeves, may be used.

b) Recycling of existing fence posts treated with prohibited substances within the operation is permitted.”

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in orchard settings with large tree canopies as the buffer zone would be measured from the edge of the non-organic tree canopy (aka the drip line) to the drip line of the organic tree. The distance is not from tree trunk to tree trunk, or even property line to tree trunk.

If contamination, such as herbicide drift, exceeds the limits of the buffer zone, additional means may be needed to contain the problem. The choice of these is left to the operator but must be “sufficient to prevent contamination.”

5.2.2 c) Crops (including seeds and forage) in buffer zones are considered non-organic, and are managed and sold outside the organic stream. Operators should be able to document what they have done with a crop grown in a buffer zone.

Examples: “I sold it to a neighbour as non-organic. Here is the receipt with ‘non-organic’ clearly indicated,” or “I fed the hay to my non-organic milk cow. I stored it separate from my organic hay in this shed.”

5.2.2 d) Isolation distances for crops that can be pollinated by GE crops are provided. If vulnerable crops are grown within that distance, other methods of mitigation are required. For example, planting corn two weeks later than neighbouring corn can minimize the likelihood of cross-pollination with neighbouring corn. In this case, no buffer is required.

Certifying bodies need to re-assess the contamination risk each year depending on changes in neighbouring land use. Operators with consistently problematic neighbours should consider planting windbreaks or installing fences to control wind-borne contamination.

5.2.3 b) The prohibition on certain types of treated wood is aimed at eliminating toxins associated with the products used

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5.2.4 “Management practices shall include measures to promote and protect ecosystem health on the operation and incorporate one or more of the following features:

- a) pollinator habitat;
- b) insectary areas;
- c) wildlife habitat;
- d) maintenance or restoration of riparian areas or wetlands; or
- e) other measures which promote biodiversity.

to treat the wood. All types of uses are affected by this prohibition including, for example, wood (i) in contact with the ground (perimeter fencing, trellises), (ii) used with livestock (fencing) and (iii) used for storage (seed, feed). The most commonly available treated fence posts are those treated with Copper Chromium Arsenate (CCA) (the green ones) – these posts are prohibited. See Table 4.2 (Column 2) for a list of permitted substances.

Numerous alternative materials are available. If wood treated with a prohibited substance was installed by a new applicant and it was the last prohibited substance used, the 36 months of transition would be counted from the installation date. If alternatives are available but the treated wood is installed by the organic producer – this would qualify as a non-compliance leading to de-certification because it is the use of a prohibited substance. If the neighbour installed the treated fence, a buffer zone (8 metres) is required to the edge of the closest crop.

No matter the installation date (more than 36 months before applying for certification), some certification bodies require setbacks from existing treated posts.

Reuse of treated wood materials within an operation is encouraged as it is not possible to dispose of treated wood in environmentally benign manner. Operators cannot use used treated wood materials acquired from outside the operation. Certifying bodies should develop an inventory of prohibited wood for every farm, so that they can ensure that new materials are not being brought onto the farm. Stockpiles should be stored in a way to minimize groundwater contamination.

5.2.4 Biodiversity is essential for healthy ecosystems and productive organic farms. For example, trees provide nesting sites for birds which devour cabbageworms. Wildflowers provide food for bees which pollinate crops, and provide habitat for beneficial organisms, such as tachinid flies which attack sawfly and armyworm larvae. Maintaining a diverse community of soil organisms increases nutrient uptake and retention, improves soil structure, and promotes symbiotic relationships between plants and soil microorganisms.

Regardless of the size or type of their farm, farmers will have to demonstrate that they promote and maintain biodiversity. For example, the operator of a greenhouse on

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NOTE: Existing native prairie, parkland, or wetland habitats should be maintained and enhanced whenever possible.”

5.3 Seeds and planting stock

5.3.1 “Organic seed, bulbs, tubers, cuttings, annual seedlings, transplants, planting stock, and other propagules shall be used. Organic seed and planting stock may be treated, primed, pelleted, or coated with substances listed in Table 4.2 (Column 1 or 2) or Table 7.3 of CAN/CGSB-32.311.”

5.3.2 “Non-organic seed and planting stock are permitted provided that:

- a) the organic seed or planting stock variety is not produced on or available from within the operation; and
- b) the organic seed or planting stock is not commercially available, and a documented search involving potential, known organic suppliers has been conducted.
- c) when treated, primed, pelleted or coated, it is with substances listed in Table 4.2 (Column 1 or 2) or Table 7.3 of CAN/CGSB-32.311 with the following exceptions:
 - i) Seed primed with substances not listed on Table 4.2 (Column 1 or 2) or Table 7.3 of CAN/CGSB-32.311 is permitted providing that the priming process does not contain pesticides that are not listed on Table 4.2 (Column 2) or Table 7.3 of CAN/CGSB-32.311;

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leased land can plant wildflowers around greenhouses. A rancher can fence off lakes and streams to prevent livestock from grazing and trampling the banks of water bodies. Field crop producers and market gardeners can leave wild areas on their farms: these include woodlots, shelterbelts and hedgerows between fields, and strips of flowering plants between crop rows.

The note to subclause 5.2.4 is intended to protect "existing native prairie, parkland, or wetland habitats." In the context of the Standard, a note is a recommendation rather than an enforceable requirement. However, the ultimate goal is to encourage organic farmers to both protect the wild areas on their farms and take more measures to increase biodiversity.

Learn more at organicfederation.ca/sites/documents/200826%20InfoBio%20ENG.pdf.

5.3.2 Ideally, organic production, including the seeding of annual field and horticultural crops, green manures, forages and pastures, begins with certified organic seed or planting stock. Non-organic seed and planting stocks may be used if certified organic forms are not available, and this is appropriately documented (generally by conducting a search with at least three organic suppliers). Documentation could be in the form of email correspondence, records of phone calls, or records of searches of seed catalogues on the Internet.

It doesn't matter if the preferred source, such as the organic seed in the example above, is much more expensive than alternatives: cost is not a factor when determining commercial availability. But if an organic product or seed cannot be imported into Canada due to import restrictions, it would be considered to be unavailable commercially.

Seed and planting stock from buffer strips is considered non-organic.

Transitional seed or planting stock may be used when an organic source is not commercially available, and would be preferred to using non-organic sources. Annual seedlings

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ii) Seeds and planting stock treated with substances necessary for compliance to international, federal or provincial phytosanitary or food safety regulations and approved for use by regulatory agencies such as Pest Management Regulatory Agency (PMRA) are permitted.

d) non-organic perennial planting stock treated with substances prohibited by 1.5 a), 1.5 b), 1.5 c) or 1.5 d) shall be managed in accordance with this standard for at least 12 months before the first harvest of organic products. The land on which non-organic stock is planted is subject to the requirements of 5.1.1.”

5.3.3 “Annual seedling transplants started in winter or spring which will be planted in the operation may be started by the operation in structures under 100% artificial lights from seeding to first transplanting. The expression “first transplanting” means moving a seedling to another growing medium (in a box, pot, container or in the ground). All clauses of 7.5 except soil volumes (7.5.2.2, 7.5.2.3, 7.5.2.4) apply to annual seedlings grown in structures.”

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(transplants) must be organic. If non-organic seed or planting stock is used, it must not be treated, coated, primed or pelleted with any prohibited substances.

Note: 5.3.2) does not apply to Sprouts, shoots and microgreens production. Only organic seed can be used for these with no exceptions (see 7.4.1).

5.3.2.d) If non-organic perennial planting stock (e.g., strawberry or asparagus crowns, trees, or berry fruit stock) was treated with prohibited substances, it must be managed organically for 12 months. The 12 months is calculated from the planting date until the harvested crop can be considered organic. If strawberries are managed as annual crops and non-organic crowns or runners used, the berries would not qualify as organic.

5.3.3 One of the principles of organic production (as outlined in II of the Introduction to the Standard) is the “Principle of ecology – Organic agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.” Natural sunlight is part of a living ecosystem and is considered by many to be an essential part of the organic crop cycle. This is one of the reasons why artificial lighting is permitted to supplement, but not replace, natural sunlight in all but a few restricted conditions. Also, some studies indicate that plants grown under natural sunlight may have better flavour and more nutrients than crops grown under completely artificial lighting. (This issue is, however, controversial and there is little research on the impact of the latest technological advances in lighting.)

This is an excerpt from an article by the Organic Federation of Canada: organicfederation.ca/sites/documents/200922%20InfoBio%20lighting.pdf.

The only plants that can be grown under 100% artificial lighting and be considered organic are:

- Annual seedling transplants started in winter or spring which will be planted in the operation as described in 5.3.3 of 32.310. These “may be started by the operation in structures under 100% artificial lights from seeding to first transplanting. The expression ‘first transplanting’ means moving a seedling

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5.4 Soil fertility and nutrient management

5.4.1 “The main objective of the soil fertility and nutrient management program shall be to establish and maintain a fertile soil using practices that:

- a) maintain or increase levels of soil organic matter,
- b) promote an optimum balance and supply of nutrients, and
- c) stimulate biological activity within the soil.”

5.4.2 “Where appropriate, the soil fertility and biological activity shall be maintained or increased, through:

- a) crop rotations that are as varied as possible and include plough-down crops, legumes, catch crops and deep-rooting plants;

to another growing medium (in a box, pot, container or in the ground).”

- Sprouts, shoots and microgreens, as defined in 7.4 of 32.310 as “crops that are generally harvested within 30 days of imbibition, either to be consumed with roots attached (e.g., sprouts and nanoshoots) or to be cut from the roots (for consumption (e.g., shoots, living greens and microgreens). Subclause 7.4 does not apply to whole head products (e.g., heads of lettuce, mini cabbage).”

5.4 A well-designed nutrient management plan is key to a successful organic farm. The goal is to provide enough nutrients to maintain healthy plants while avoiding an excess of nutrients. If nutrient levels are too low, crop health and yields may suffer. If they are too high, nutrients can be lost, this is a waste of nutrients and can possibly lead to water pollution. The balance is achieved by focusing on sources of nutrients that are slowly released in the soil, usually with the aid of microorganisms. For example, rather than relying on highly soluble and concentrated fertilizers to provide nutrients to crops in the field, organic farmers focus on building the soil through inputs of organic matter (e.g., green manures, compost, crop residue). These will build the organic matter content in the soil and increase the nutrient and water holding capacity of the soil.

5.4.1 requires organic operators to establish a soil fertility and crop nutrient management program. This program should be part of the farm plan, and should be updated every year. Coupled with 5.4.2, this requires organic farmers to work actively to improve the quality of the soil on their farm. It is not enough to have good soil and to ‘settle’ for whatever yields result – organic farming is an active soil improvement process.

5.4.2 a) Although rotations are to be as varied as possible, this does not preclude the possibility of growing the same crop for two years in a row provided the producer can show that soil fertility, nutrient management and pest management can be maintained.

A well-designed crop rotation has many benefits including:

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b) incorporation of plant and animal matter in compliance with this standard and with Table 4.2 (Column 1) of CAN/CGSB-32.311, including the following:

- 1) composted animal and plant matter;
- 2) non-composted plant matter, specifically legumes, plough-down crops or deep-rooting plants within the framework of an appropriate multiyear rotation plan; and
- 3) unprocessed animal manure, including liquid manure and slurry, subject to the requirements of 5.5.1.”

5.4.3 “Tillage and cultivation practices shall:

- a) maintain or improve the physical, chemical and biological condition of soil, and
- b) minimize damage to the structure and tilth of soil, and
- c) minimize soil erosion.”

5.4.4 “Plant and livestock materials shall be managed to maintain or improve soil organic matter content, crop nutrients and soil fertility, and in a manner that does not contribute to the contamination of crops, soil or water by plant nutrients, pathogenic

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- controlling weeds, diseases and insect pests;
- managing nutrients in a way that reduces leaching and loss, while providing a slow release of nutrients as needed;
- fixing nitrogen from the air and making it available for following crops;
- increasing or maintaining sufficient levels of organic matter in the soil,
- increasing both biodiversity and income diversity on the farm.

5.4.2 b) Plant material does not need to be incorporated immediately, just incorporated within the overall rotational plan. Plant material can be applied in the form of plant/food processing byproducts. For example, spent brewers' grains can be used as a soil amendment, even if non-organic, as long as it is non-GE and any non-agricultural substances added during the brewing process are listed on Table 4.2 (Column 1) of 32.311 and comply with 1.4 and 1.5 of 32.310. For example, diammonium phosphate (DAP) added during the brewing process would render spent brewers' grains non-compliant (not permitted) for use as a soil amendment. If the material is GE, it may qualify as a compost feedstock (see Table 4.2 (Column 1) of the PSL).

Certifying bodies should verify that operators are following their soil fertility and crop nutrient management programs.

5.4.3 Tillage practices should be planned to minimize soil damage by paying attention to soil moisture (i.e., not tilling when the soil is too wet or too dry), minimizing the disruption of the soil profile, avoiding the creation of hardpans and other methods. Tillage should be done within a management regime that seeks to maintain or improve the condition of the soil, such as a well-designed crop rotation which incorporates green manures, cover crops, catch crops and perennial forages.

Certifying bodies should verify that tillage and cultivation practices are maintaining or improving the overall structure of the soil.

5.4.4 Manure, and even green manures (e.g., plowdowns of alfalfa or clover), can cause an excess of nitrogen that can result in pollution to the surrounding environment. In situations where leaching is likely, application rates and timing

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organisms, heavy metals or residues of prohibited substances.”

5.4.5 “The organic matter produced on the operation shall be the basis of the nutrient cycling program. It may be supplemented with other nutrient sources described in the standard or listed in Table 4.2 (Column 1) of CAN/CGSB-32.311. Manure is also subject to the requirements of 5.5.1.”

5.4.6 “Burning to dispose of crop residue produced on the operation is prohibited. However, burning may be used for documented problems with pests, including insects, diseases or weeds (see 5.6.1), or to stimulate seed germination.”

5.5.1.1 “Animal manure produced on the operation shall be used first. When all available manure is used up, organic manure from other sources may be used. If organic manure is not commercially available, non-organic manure is permitted provided that a) the non-organic source is not a fully caged system in which livestock cannot turn 360°; and

b) livestock is not permanently kept in the dark; and

c) the source and quantity of manure, type of livestock, and evaluation of the criteria in 5.5.1.1 a) and 5.5.1.1 b) shall be recorded.

NOTE: Organic operations should make it a priority to use manure obtained from

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should be managed to minimize risk; catch crops (heavy-feeding cover crops) should be used to reduce nutrient losses to the environment. Vegetated setbacks to water ways are necessary to minimize surface runoff. Riparian areas on livestock operations should be fenced off to keep livestock out of waterways.

Material brought onto the farm should be compliant with 5.5.1 and listed in Table 4.2 (Column 1) of the PSL.

5.4.5 The nutrient cycling system should be based primarily on on-farm organic matter such as green manures, animal manure, compost and crop residues. Off-farm sources can be used only to supplement, not replace, the on-farm resources.

On organic farms, nutrients are supplied primarily through crop rotations, ploughdown crops (i.e., green manures), the application of compost and the incorporation of other plant residues (such as mulch) into the soil. Certain fertilizers can be used at times to supplement nutrients. Table 4.2 (Column 1) of the PSL contains a list of permitted fertilizers and the conditions in which they can be used. In general, the permitted fertilizers are made from mined or biological substances and are not chemically treated.

5.4.6 “Crop residues” include straw from annual crops, as well as prunings from woody crops. Burning is only considered acceptable if operators can verify a legitimate need for burning, such as destruction of wood-bearing fire blight or vines bearing powdery mildew. Burning is not a first line of defence against pest insects, diseases and weeds, and should only be used where this is the only method available for control.

5.5.1 The order of preference of manure source is as follows (from most preferred to least acceptable):

1. Organic livestock on the farm.
2. Non-organic livestock on the farm.
3. Organic livestock from other farms.
4. Livestock from a transitional or extensive livestock operation (where animals are primarily out-of-doors).
5. Livestock from a landless livestock operations Livestock from an operations using GE ingredients in animal feed.

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transitional or extensive livestock operations, not from landless livestock production units or from livestock operations that use genetically engineered (GE) ingredients or GE derivatives in animal feeds.”

5.5.2.1 “The manure application program shall address land area, rate of application, time of application, incorporation into the soil and retention of nutrient components.”

5.5.2.2 “Soil amendments, including liquid manure, slurries, compost tea, solid manure, raw manure, compost and other substances listed in Table 4.2 (Column I) of CAN/CGSB-32.311, shall be applied to land in accordance with good nutrient management practices.

NOTE: In Canada, some additional provincial requirements may also apply.”

5.5.2.3 “Where manure is applied, the soil shall be sufficiently warm and moist to ensure active bio-oxidation.”

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“Extensive livestock” refers to animals that are raised primarily out-of-doors. Non-organic sources may only be used from sources where animals can turn around. This is the intended meaning of “not fully caged.” Manure from veal crates and hog farrowing crates are prohibited. This does not prohibit manure from caged poultry.

If an operation has some fully caged livestock and other animals that are not fully caged, manure may be used from the livestock that are not fully caged provided that the manure is kept separate from that of the fully caged livestock.

5.5.2.2 Manure applications should meet provincial requirements. An online search for “manure management” and the province should lead to a detailed list of requirements.

Farmers should be prepared to prove to certifying body inspectors that they have assessed their crop nutrient needs, the nutrient value of their soil, and the nutrient value of their soil amendments. (They can calculate the value of amendments or get such information from product manufacturers.)

Farmers should be prepared to prove they are applying the appropriate amount of soil amendments for their particular cropping needs. Much to their dismay, many organic farmers only realize after a proper soil assessment that they have been applying too much compost to their soil. In an attempt to increase the nitrogen content (for yield), they often increase phosphorus levels beyond the capacity of the soil (which can result in phosphorus leaching and environmental damage).

The key goal in nutrient management planning is to achieve a proper nutrient balance in your soil, and to maintain that balance over time. Soil assessment methods include: soil tests, plant symptom analysis, plant tissue analysis, assessing crop yields, and evaluating weed characteristics and weed pressure.

5.5.2.3 Manure, whether fresh or aged, can be applied only if the ground is warm and moist. Aged manure is manure which has been piled for at least six months but has not been turned or monitored to ensure that the material has passed through

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5.5.2.4 “The seasonal timing, rate and method of application shall ensure that manure does not:

- a) contribute to the contamination of crops by pathogenic bacteria;
- b) create significant run-off into ponds, rivers and streams;
- c) contribute significantly to ground and surface water contamination.”

5.5.2.5 “The non-composted solid or liquid manure shall be:

- a) incorporated into the soil at least 90 days before the harvest of crops that do not come into contact with soil and are intended for human consumption; or
- b) incorporated into the soil at least 120 days before the harvest of crops that have edible parts that come into direct contact with the surface of the soil or with soil particles.”

5.5.2.6 “If livestock are used as part of the cropping or pest control program, a management plan shall be in place to ensure that livestock are controlled and that manure or manure-related contamination does not reach the portion of the crop intended for harvest.”

a thermophilic phase. “Sufficiently warm” soil is generally around 10C.

Manure is broken down and nutrients are released through bio-oxidation. Bio-oxidation requires bacteria, which are most active in warm and moist environments, generally the same time plants are actively growing. When such bacteria are not active, nutrients can be lost, resulting in pollution off-site. Catch crops can be used to hold nutrients if land is not cash-cropped immediately.

Manure should not be applied to frozen soil or when heavy rains are imminent.

5.5.2.4 To avoid polluting water bodies and groundwater, incorporate manure as soon as possible after application, and grow a crop or catch crop as soon as possible after that.

5.5.2.5 This requirement for manure management applies to growing human food only; it does not apply to growing livestock feed.

For example, 90 days would be required between applying manure and harvesting crops such as grain or corn. A longer period of at least 120 days is needed between the application of manure and the harvest of the following:

- root crops (because they are grown in the soil);
- crops that might touch the soil; and
- crops that might have soil splashed onto the edible parts.

For example, 120 days are needed for carrots, salad mix and tomatoes. Rather than applying manure to bare soil or food crops, farmers can apply the manure to a green manure crop the year before the food crop is grown.

5.5.2.6 applies to the intentional use of livestock in cropping situations (field crops, vineyards, orchards), and does not apply to droppings from wild animals.

A manure management plan is required if animals are present where food is grown. For example, strawberry growers may use geese to weed their fields in the establishment year,

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5.5.3 “Processing of animal manure using physical treatment (for example, dehydration), biological treatment or chemical treatment with substances listed in Table 4.2 (Column 1 or 2) of CAN/CGSB-32.311 is permitted. Loss of nutritional elements due to processing shall be minimized.”

5.6 Management of crop pests, including insects, diseases and weeds

5.6.1 “Practices to control pests, including insects, diseases and weeds, shall focus on organic management practices that enhance crop health and reduce losses due to weeds, disease, insects and other pests. Management practices include cultural practices (for example, crop rotations, establishment of a balanced ecosystem, and use of resistant varieties), mechanical techniques (for example, sanitation measures, cultivation, trapping, mulching and grazing) and physical techniques (for example, flaming against weeds and the use of heat against diseases).”

but keep the geese out in the fruiting year. Sheep or pigs may be pastured in the orchard following the harvest to clean up fallen apples to help both with pest control and provide nutrients with their manure droppings. A manure management plan may include using a manure bag on draft horses when they are used to cultivate the vegetable garden.

Animals may be used for stubble grazing, but the farmer needs to be very careful about using animals to spring graze a winter annual crop like fall rye. Livestock removal dates should be recorded, and harvest delayed appropriately.

5.6 Although the term “pest” is often used to refer to insect pests, in the Canadian Organic Standard, “pests” refers to any living organism that damages humans or human resources. This includes weeds, as well as insects that damage plants, parasites that affect livestock, birds that eat berries and microorganisms that cause disease in crops or livestock.

5.6.1 Managing insect pests, weeds, diseases and other pests is primarily a matter of management, not inputs. Many resources, including books, conferences and on-line courses, are available to help organic farmers learn about pest management.

Examples of common mechanical or physical methods:

- Increasing or introducing populations of natural predators and parasites of pest species;
- Promoting conditions conducive to establishing, protecting, encouraging and maintaining natural predators and parasites of pests (e.g., hedges, nesting sites, and ecological buffer zones that maintain the original vegetation to sustain natural pest enemies);
- Mowing; • Using stale seedbeds; • Grazing of animals;
- Mechanical cultivation and hand weeding;
- Flame weeding or heating if alternative methods of soil renewal or rotation are not feasible.

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5.6.2 “When organic management practices alone cannot prevent or control crop pests, including insects, diseases and weeds, a biological or botanical substance, or other substances listed in Table 4.2 (Column 1 or 2) of CAN/CGSB-32.311 may be used. Conditions that led to the use of substances shall be documented in the organic plan (see clause 4).”

5.6.3 “If application equipment, such as a sprayer, is used to apply prohibited substances, it shall be thoroughly cleaned prior to use in an organic crop.”

5.7 “The irrigation of organic crops is permitted provided that the operator documents the precautions taken to prevent contamination of land and products with substances not included in CAN/CGSB-32.311.”

5.8 “Wherever organic product preparation takes place, 8.1 and 8.2 apply.”

• Mulching – plastic mulch, tunnels, hay wrappers and other plastics used for crop production or protection are permitted provided they are not incorporated into the soil or left in the field to decompose. They shall be removed at the end of the growing season. In perennial crops, plastic mulches may be left for more than one season but shall be removed before the plastic decomposes. The use of polyvinyl chloride as plastic mulch or row cover is prohibited. Biodegradable mulch must meet the criteria outlined in the PSL listing annotation (see Mulch in Table 4.2 of the Permitted Substances Lists (PSL)).

5.6.2 Inputs are considered only after management practices have fallen short of the desired control. Reasons for the use of inputs should be documented, as well as details of product use.

5.6.3 If chemical smells remain after cleaning spray equipment, this means that chemical residue has been left behind. Where cleaning is insufficient to eliminate a contamination risk with a used sprayer, certain parts (such as hoses, tanks, nozzles) may need to be replaced. Cleaning procedures can generally be obtained from the manufacturer.

5.7 If a prohibited substance (e.g., Magnicide) had been used in the irrigation system, testing for Magnicide residues and/or documentation (such as exclusion dates and treatment schedules) is required to show that sufficient time has passed to allow the substance to dissipate from the irrigation water before irrigating the organic land.

5.8 Prepared products must maintain organic integrity and accurately label product composition. See 8.1 and 8.2 for details.

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5.9 “Subclause 8.3 applies to pest management practices in and around crop facilities.”

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