Dairy Farmers of Ontario's Grass-Fed Milk Standard

If you have any questions or comment, please contact Bita Farhang:
Bita.Farhang@milk.org

During the last couple of years, there has been an increasing number of demands from processors for the supply of grass-fed milk. Therefore this protocol developed in 2017, aims at setting the basis of the Ontario Protocol for Grass-fed milk.

Efficient grass-fed farming requires a high forage diet with as much fresh grass as possible with limited amount of concentrates, considering limitations imposed by climate and other environmental factors and cow's nutritional needs. Cows in early lactation may need more concentrates than cows in mid lactation and cows in late lactation may not need to be fed any concentrates. For this reason, managing a grass-fed operation requires commitment to the operation and to grass-fed principles.

T his protocol focusses primarily on feed and farming requirements. A secondary focus is to authenticate grass fed milk based on specific biomarkers that are metabolized by cows under a grass-fed diet. The **Proposed biomarker is a maximum ratio of Linoleic Acid to Alpha Linolenic Acid (these are specific types of Omega 6 and Omega 3 fatty acids respectively)** . It is important to note that the biomarker testing is considered as a management tool for monitoring the feeding requirements instead of absolute values to reach or not to exceed, regardless of the type of feeds used.

1. Feeding Protocol

1.1. Forage/grass must provide at least 75 % of the total dry matter intake of a dairy cow.

1.2. 25% of the total dry matter intake is targeted to come from grains and supplements except prohibited feeds, as listed in 1.3. This ratio can go up to maximum 30% of the total dry matter intake in non-growing season with a written recommendation from a nutritionist.

1.3. Grass-fed animals **cannot be fed the prohibited feeds** listed below:

- **Corn silage**, but can be fed corn grain
- **Corn distiller grains**
- **Any type of plant oils/fats**
- **Any type of Marine oils/fats/by-products**
- **Any type of animal or poultry fat**
- **Full-fat soybeans, sunflower and safflower seeds or oils but can be fed these meals**
- **Linseed (flaxseed) for less than 1 kg per day.**
- **Urea or any other non-protein nitrogen supplements.**

1.4. Mineral and vitamin supplements may be provided as required (as prescribed by the manufacturer, a

veterinarian or qualified nutritionist) with the exception of mineral and vitamin supplements containing any prohibited ingredients (e.g., fishmeal, and urea).

1.5. A record of feeding and pasture protocol must be kept on a weekly basis, and the grass-fed farm must fully keep all documents

1.6. Forage is defined as "any herbaceous plant material that can be grazed or harvested for feeding, except for post-vegetative state cereal/grain". This includes grass (annual and perennial), forbs (legume and brassicas), browse, and cereal grain crops in the vegetative state. The vegetative state is a stage in cereal plant growth at which the plant "contains non-reproductive plant parts (leaf and stem), in contrast to reproductive plant parts (flower and seed) and is still in the developmental stages of plant growth." According to Zadok's table, which illustrates cereal grain growth and development, large grains, such as corn, should be in the development stage before the boot stage to ensure a vegetative state.

2. Pasture Management, Grazing, Confinement and Stock Piled Forages

2.1. All dairy cows should have access to pasture at least 120 days a year for 6 hours per day during the grazing period. In regions where the grazing period is less than 120 days, they must be on pasture for at least 6 hours per day while the weather permits.

2.2. A pasture management plan must be in place to show pasture is being managed as a crop and is being rotated to allow for proper rest and regrowth of the pasture before the animals are reintroduced to the area.

2.3. Pasture shall be managed in a way that will not degrade the soil or quality of the pasture and natural resources with the exception of having a sacrifice area during the non-grazing season.

2.4. The grazing area must be greater than 0.13 hectare (0.33 acre) per cow.

3. Animal Health and Welfare

The welfare of the animal always comes first. This Protocol requires compliance with the Canadian Code of Practice for the Care and Handling of Dairy Cattle. To be on the grass fed program, compliance with this Code must be validated through the proAction® program.

4. Auditing and verification

4.1 The feeding protocol and the biomarkers are verified by DFO. The grass-fed farms will be audited by the FSR (Field Service Representative) to ensure compliance to the Protocol. This audit would cover:

- On-farm production conditions, which must be checked at least once a year
- The authentication of milk that is produced under this Protocol

4.2 Authentication of milk that is produced under this Protocol is based on the feeding protocol and specific biomarkers that are transferred from the diet to the milk or that are specifically produced by ruminal microorganisms or by the animals' metabolism under a grass-fed diet as follows:

- **The 18:2 n-6/18:3 n-3 ratio in grass-fed milk is less than or equal to 3**

4.3 Prior to supplying milk into a grass-fed program, the grass-fed farm must demonstrate that the biomarkers are tested in the milk on regulatory bulk tank samples weekly during the first four or 10

weeks of being on the grass-fed program, and at least monthly thereafter.

4.4 Milk cannot be marketed as grass-fed until two (2) consecutive bulk tank tests meet the minimum level of the biomarkers and a third-party auditor provides a report indicating compliance with the Protocol.

Definitions

Boot Stage: The flag leaf is fully expanded, but the awns and grain head are not visible. The grain head can be felt in the flag leaf sheath.

Brassicas: A family of very productive annual forage vegetables used as transition crops between pasture renovations or as a supplemental feed source for extending the grazing season when other forages are less productive. Examples include turnips, rape, and kale.

Browse: 1) Leaf and twig growth of shrubs, woody vines, trees, cacti, and other non- herbaceous vegetation available for animal consumption. 2) To browse: the consumption of browse in situ by animals (Barnes R.F. et al 1995).

Diet: The feed regularly offered to or consumed by an animal (Barnes R.F. et al 1995).

Ensiled: Having been subjected to anaerobic fermentation to form silage. (Cullison, A. E. 1979)

Fermentation: Chemical changes brought about by enzymes produced by various microorganisms. (Cullison, A. E. 1979)

Forage: Edible parts of plants, other than separated grain, that can provide feed for grazing animals, or that can be harvested for feeding. Includes browse, herbage, and mast; Vegetative material in a fresh, dried, or ensiled state (pasture, hay, or silage), which is fed to livestock.

Forb: Any herbaceous broadleaf plant that is not a grass and is not grass-like. (Barnes R.F. et al 1995)
Fruit: 1) The usually edible reproductive body of a seed plant, one having a sweet pulp associated with the seed. 2) A product of fertilization in a plant with its modified envelopes or appendages, specifically the ripened ovary of a seed plant and its contents.

Grain: Seed from cereal plants, caryopsis. Corn, wheat, rye, oats, rice, millet, sorghum, barley, triticale.

Grass: Member of the plant family Poaceae (Barnes R.F. et al 1995).

Graze: 1) the consumption of standing or residual forage by livestock; 2) to put livestock to feed on standing residual forage

Grazing Season: The period when pasture is available for grazing, due to natural precipitation or irrigation.

Growing Season: The number of days between the last spring freeze date and the first fall freeze date.

Hay: The aerial parts of forage crops stored in the dry form for animal feeding (Cullison A.E. 1979).

Haylage: Haylage is the feed produced by storing a forage crop; dried to a moisture level of about 45- 55% in an airtight silo (Cullison A.E. 1979).

Legumes: Members or the Fabaceae plant family (formerly known as the Leguminoseae family). Legumes are dicots (produce two seed leaves), produce seed in a pod, have netted leaf venation, and usually have a taproot

type of root system. Most legumes can interact with bacteria of the genus Rhizobium to fix nitrogen in nodules on their roots. Legumes may have one of four types of seedheads. These seedhead types are the raceme, the spike, the head or umbel (Ball D.M.et al. 2007).

Meadow: Area covered with grasses and/or legumes, often native to the area, grown primarily for hay but with secondary grazing potential (Barnes R.F. et al 1995).

Mineral: 1) a solid homogeneous crystalline chemical element or compound that results from the inorganic processes of nature. 2) Any of the various naturally occurring homogeneous substances obtained usually from the ground. 3) a synthetic substance having the chemical composition and crystalline from and properties of a naturally occurring mineral.

Non-Grazing Season: The period when pasture is not available for grazing, due to natural precipitation or weather. Varies with the region of Canada.

Pasture:1) Forages harvested by grazing animals. 2) An area of land with 75% forage cover or unbroken land on which livestock may graze at will.

Sacrifice pasture: A pasture where animals may move about and express their natural behaviours and where forage can be grown during the grazing season.

Separated Grain: Grain detached from cereal crop plants.

Silage: Forage preserved in a succulent condition by partial anaerobic, acid fermentation.

Supplement: A nutritional additive (salt, protein, phosphorus, etc.) intended to improve the nutritional balance and remedy deficiencies of the diet (Barnes R.F. et al 1995).

Supplemental Feeding: The practice of supplying feedstuffs to correct nutritional deficiencies in an animal's "natural" diet.

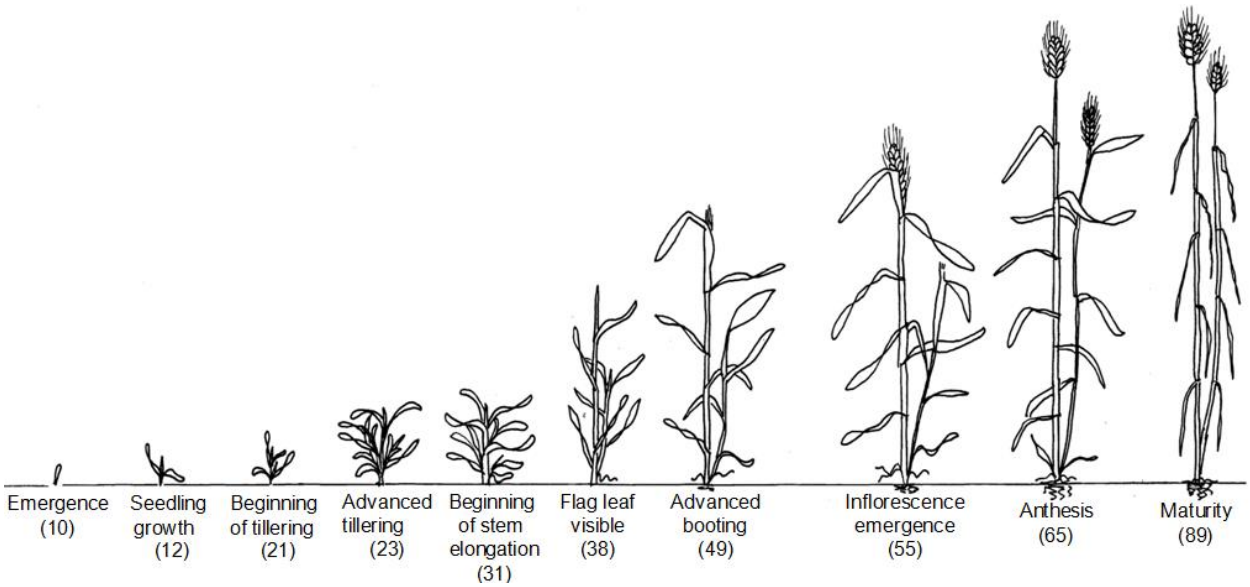
Vegetative: Non-reproductive plant parts, (leaf and stem) in contrast to reproductive plant parts (flower and seed) in developmental stages of plant growth. The non-reproductive stage in plant development (Barnes R.F. et al 1995).

Vegetative State/Stage: A stage in cereal plant growth at which the plant "contains non-reproductive plant parts (leaf and stem) in contrast to reproductive plant parts (flower and seed) and is still in the developmental stages of plant growth.

Vitamin: Any of various organic substances essential in minute quantities to the nutrition of most animals and some plants that act especially as coenzymes and precursors of coenzymes in regulating of metabolic processes

APPENDIX A

Figure 1: Zadoks Scale, Which Describes the Stages of Grain Plant Growth and Development



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