



Compiled and Edited by

Calvin H. Pearson
Colorado State University
Western Colorado Research
Center at Fruita
1910 L Road
Fruita, CO 81521

Joe E. Brummer
Colorado State University
Soil and Crop Sciences
Fort Collins, CO 80523

Bob Hammon
Melissa L. Franklin
Colorado State University
Tri River Area Extension
2775 Highway 50
Grand Junction, CO 81502

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Section III

Organic Production of Alfalfa and Grass

Chapter 19

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Calvin H. Pearson, Joe Brummer, and Bob Hammon

The production of organic hay in the Intermountain West is mainly for the organic dairy industry. Organic hay in the Intermountain West consists of alfalfa, grass, and alfalfa/grass mixtures. Much of the organic hay is alfalfa with lesser amounts of grass and alfalfa/grass mixtures. Organic hay production occurs in various and scattered locations in the Intermountain West and surrounding states. The amount of organic hay produced by individual growers in the Intermountain West varies considerably, ranging from those who produce only a few tons per year to those who produce thousands of tons each year.

In 2008, the production of organic milk in the United States totaled 2.8 billion pounds with an estimated value of \$750.2 million (Schultz, 2009). Organic milk cows comprise about one percent of all U.S. milk cows in 2005 (McBride and Greene, 2010).



Fig. 1. In an organic dairy operation cows graze organic pastures for feed as shown here in Platteville, Colorado on a 400-acre organic pasture (Photo courtesy Aurora Organic Dairy).

Organic milk is produced on more than 2,000 farms in the United States (Schultz, 2009; McBride and Greene, 2010). Eighty-

seven percent of the organic dairies in the U.S. have fewer than 100 milking cows.

Cows that produce organic milk must be fed certified organic feed, such as alfalfa and grass hay, along with other certified organic feeds such as grain and silage. A requirement for organic certification of dairy operations is that animals over six months in age must have access to pasture (Figs. 1, 2).



Fig. 2. The convenient location of the on-farm processing plant adjacent to an organic dairy farm in Platteville, Colorado is ideal (Photo courtesy Aurora Organic Dairy).

According to the 2007 U.S. Census of Agriculture there are more than 975,000 acres of organic pastures in the United States. Pasture supplies 50 percent of the forage for nearly two-thirds of the organic dairies and 75 percent of the forage for a third of the organic dairies in the United States (McBride and Greene, 2009).

Contemporary organic production technology is relatively new to modern agriculture, and organic producers are motivated to identify more efficient and effective production methods for their particular haymaking operations. While the principles of organic hay production may apply equally to all

producers, the actual organic production practices and techniques used by specific growers may vary.

Persons, operations, and business entities that produce or handle agricultural products that are intended to be sold, labeled, represented, or marketed as organic must be certified by the USDA. Certified organic products and practices are obtained through an application and inspection process. Certifying agents, whether state, private or from foreign organizations must be accredited by the USDA. These agents certify that organic production and handling practices meet national organic standards and that they are applied and enforced with uniformity. (USDA-National Organic Program <http://www.ams.usda.gov/AMSV1.0/nop>.)

Agencies that are accredited by the USDA as organic certifiers serve both producers and consumers through the application and inspection processes that they administer. The organic certification program assures consumers that organic agricultural products are produced within the rules and regulations established by the USDA. Persons interested in becoming certified organic hay producers should contact a certifying agency within their state such as their state department of agriculture or qualified private entity to obtain the specific rules, regulations, and procedures for certifying their specific product. For more information see the websites at end of chapter.

Location and Field Selection

Organic hay production is typically more site and location sensitive compared to conventional hay production. When a problem is encountered with conventional hay production, technological resources such as fertilizers, herbicides, and insecticides are readily available that can provide a relatively quick remedy. Production problems in organic hay fields may require longer term remedies. For example, it is not a good idea

to attempt organic hay production in a field infested with a creeping perennial weed until after the weed problem is controlled. This may require the use of conventional herbicides followed by the customary 3-year transition period to obtain organic certification.

Furthermore, technology that works successfully in one area for organic hay production, may not work similarly in another area. While many production practices for organic cropping systems are similar to conventional production, others are not. For example, weed control practices for organic production do not allow for the use of conventional herbicides.

Both the field and the region where the field is located will impact organic production of alfalfa and grass. Selecting fields that have a consistent and known history of successful weed control and low weed seed reservoir are important. Factors affecting successful organic production include; elevation, irrigation water source, access to markets, temperatures, and length of growing season.

Stand Establishment

Seedbed preparation is very important for successful establishment of organic forage crops. The use of synthetic herbicides to control weeds during establishment of alfalfa and grass crops is not allowed for organic hay production. Hence, organically allowable production practices must be used to control weeds during crop establishment.

An example of a production practice used to control weeds during crop establishment is the strategic use of tillage. All seedbed preparation is completed with the exception of planting. The field is allowed to set for approximately one week and then immediately prior to planting a shallow tillage operation is performed to eliminate any new flush of germinating weeds. The crop seed is planted and promptly irrigated to promote rapid germination. Rapid emer-

gence of alfalfa and grass seed can out compete many weed species.

Including a companion crop with alfalfa may also provide some competition against weeds during crop establishment. Many organic alfalfa producers plant a companion crop of oats. Typical planting rates for alfalfa range from 12 to 20 lbs of seed per acre and planting rate while the oats are planted at 40 to 50 lbs of seed per acre.

Fertilizers

As already noted, many of the same principles that apply to conventionally-grown alfalfa and grass hay also apply to organically-produced hay; however, the source of nutrients for organic hay production differs. Fertilizers used for organic production of alfalfa and grass must meet organic certification standards. Such fertilizers include composted manure, mined lime, and various microbial products. If application rates are too low, crop needs will not be met and yields and quality will be reduced. If application rates are too high, organic materials may decompose too slowly to meet crop needs.

Insect and Disease Control

Beneficial insects are usually abundant in alfalfa fields and organic hay producers rely on them to keep pest insects at non-damaging levels. Most beneficial insects establish and disperse to fields naturally. Typically, they are either killed or migrate from the field during harvest and then re-establish as the crop regrows. Generalist beneficial predators that have a relatively wide host range include lady beetles, green and brown lacewings, snakeflies, damsel bugs, minute pirate bugs, and many others. Parasitic wasps tend to be relatively host specific and can be important for controlling aphids, caterpillars, and alfalfa weevil larvae. One management practice shown to conserve natural enemies is to stagger harvest on the

farm by not cutting all hay fields at the same time. Areas of uncut forage act as a refuge that provide food sources for beneficial organisms as they migrate from newly cut hay fields.

Organic alfalfa and grass production has many of the same pests discussed in Chapters 4 and 16. In organic alfalfa production, alfalfa weevil will likely be a threat to first and second cutting yield and quality in areas where it is common. Problems are typically worse at lower elevations, with a lesser impact at higher elevations. Two options to consider in controlling alfalfa weevil are grass mixtures and parasitoids.

Generally, alfalfa grass mixes tolerate alfalfa weevils damage better than pure alfalfa stands. If this fits production goals, it can significantly reduce damage from this insect.

Several species of parasitic wasps are known to attack alfalfa weevil in the Intermountain West. *Bathyplectes curculionus* and *Tetrastichus insertus* are well established across most alfalfa production areas and can provide parasitism in excess of 50% in some areas. Organic producers favor the use of parasitoids for reducing the impact on alfalfa weevil and other insect pests. Growers can monitor their fields for these parasitoids by collecting a sample of weevil larva infested alfalfa foliage and placing it in a loosely closed paper bag. Provide the larvae with fresh food every couple of days, and watch for distinctive small brown smooth wasp pupae to appear as larvae pupate.

Other insects that could be occasional problems in organic alfalfa production are aphids, especially early season aphid populations that build up before predators have a chance to begin feeding. Alfalfa caterpillar, the larva of the common sulfur yellow butterfly, can be an occasional late season pest. Alfalfa caterpillars can be especially damaging when they feed on newly emerged seed-

lings in the late summer or fall planted fields. Yellow striped armyworm is an occasional late season tropical migrant that can defoliate mid and late season hay production at lower elevations. There are several Bt formulations available for organic control of lepidopterous defoliators, but their effectiveness is greatest against early instar larvae. Their use should be limited to high populations of caterpillars less than an inch in length in established fields, or when small caterpillars are easily found in new seedlings.

Organic hay producers need to monitor their fields for beneficial and pest insects and take action when pests approach damaging levels. Timing of cuttings is one option to control defoliators given there are few effective insecticides allowed for organic hay production.

Weed Control

Weed control is of paramount importance to organic hay producers; however, for many organic producers weed prevention is even more important. Maintaining fields with few weeds and a low weed seed bank in the soil is key to minimizing weed infestations.

As with other aspects of organic forage production, weed control requires a high degree of management. Growers must scout fields regularly and identify and remedy weed problems before they become large problems that cannot be controlled without incurring a lot of time and expense.

Perennial weeds are a major challenge to organic forage production. Some organic producers have found success with perennial weed control by using crop rotations, deep tillage and plowing, and harvest timing. If organic methods do not successfully control perennial weeds it may be necessary to suspend organic production and apply synthetic herbicides for one or more years until perennial weeds are controlled prior to resuming organic alfalfa and hay production.

Irrigation water source has implications for weed control. Irrigation water obtained from a canal system can transport significant numbers of weed seeds in the water. In contrast, fields that are irrigated with water obtained from wells often contribute far fewer weed seeds to fields than those that are irrigated with canal water.

During establishment, weeds will likely compete with young alfalfa and grass seedlings. If weeds begin to compete adversely against seedlings, clipping, mowing, or flailing may be necessary. These mechanical operations should be implemented at a height that removes as much of the weed growth as possible, while minimizing damage to the alfalfa plants.

Planting date affects the development of weed problems. The preferred time of planting among organic hay producers may vary. Given the range of production practices and environments, some organic hay producers prefer to spring plant alfalfa and grasses. Other organic producers prefer to plant in late summer or early fall when the soil is warm. Spring planting allows the option of planting a cover crop with the alfalfa to suppress weeds and also allows some additional hay production in the establishment growing season. Fall planting promotes rapid seed germination and occurs at a time of year when many of the summer annual weeds have completed their life cycle and will not compete against young alfalfa and grass seedlings. Fall plantings must occur early enough and in environments where new alfalfa and grass plants grow sufficiently to overwinter without experiencing winter damage.

Harvesting and Hay Yields

The harvesting and haying operations for organic hay production are similar to those used for conventionally-produced hay. According to some organic hay producers, hay yields of organic alfalfa and grass hay are

often 10 - 15% less than conventionally-produced hay. With the planting of highly productive and adapted varieties and the use of good production practices and management, hay yields of organic and conventionally-produced should be similar in many situations (Fig. 4).



Fig. 4. Organically-produced hay, pictured here, is grown mainly for the organic dairy industry (Photo courtesy Aurora Organic Dairy).

Crop Management

Consistent and thorough crop management is essential for successful crop production of organic alfalfa and grass hay. Production of organic hay often requires producers to spend more time checking fields than is required for conventionally-produced alfalfa and grass hay. The additional labor is spent in scouting for insects, weeds, and diseases, and controlling weeds in fields. It is much easier to control weed, disease, and insect infestations when they are identified and managed at an early stage of development than when the problem becomes widespread and severe. Many organic producers consider typical labor inputs for organic hay production to be 15-20% higher than those for conventionally-produced hay.

Alfalfa and grass fields used for pasture must be managed differently than fields used for hay production. The intensity of pasture management has a direct effect on productivity of organic pastures as a source of forage for organic dairies. Proper rotational grazing of pastures is a sound management

strategy that can increase the total quantity and quality of feed obtained from organic pastures. As with conventional production, livestock should only be allowed to graze for specified periods before moving them to new pastures or paddocks.

Grazing alfalfa is not widely practiced by many producers although it is more commonly used by organic growers. Bloat is a common concern among producers when alfalfa and other bloat-prone legumes such as red clover, white clover, and sweet clover are grazed by ruminant animals. No management practice can guarantee that bloat will not occur when bloat-prone legumes are grazed by ruminant animals; however, bloat can be minimized when several precautions are observed:

- Fill animals with dry grass or hay before grazing alfalfa.
- Do not allow hungry animals to graze lush alfalfa.
- Identify and use a “chronic bloater” as an indicator animal.
- Use bloat products as recommended on the product label and only as allowable under organic production requirements.
- Consider using bloat-reducing compounds such as antifoaming agents but only as allowable under organic production requirements.
- Monitor animals regularly during grazing, particularly at first.
- If possible, grow an alfalfa/grass mixture.
- Give animals a choice of dry feed or mature grass when grazing alfalfa.
- Do not graze immature alfalfa or alfalfa/grass mixtures. Some organic producers have found little bloat occurs by grazing alfalfa when it is short and maintaining it short, keeping in mind this practice may have adverse effects on stand longevity.
- Do not begin grazing early in the morning.

- Do not allow animals to graze alfalfa that is wet with dew.
- Provide salt and minerals to animals during grazing.
- Keep a close watch on animals when they are grazing during cloudy, cool, rainy weather for signs of bloating.
- Do not graze alfalfa for three days following a frost (28°F). Remember, the harder the frost the greater the risk of bloat.
- When using rotational grazing move animals to new paddocks during midday or later.

Markets and Marketing

While the primary market for organic alfalfa and grass hay are organic dairies, other market niches for organic hay exist in the organic beef, lamb, and other livestock industries.

The price of organic hay is generally higher than that for comparable conventionally-grown hay. The price of organic hay can range from 5% up to 40% higher than conventional hay. As with conventionally-produced hay, there is also considerable variation in the price of organic hay. Many factors influence organic hay prices, including supply and demand, quality, transportation costs, purchase lot size, and others.

As with conventional hay, consistent and reliable markets are important to create and maintain. Brokers who are trustworthy and farmers who consistently produce a quality product are important factors to satisfy buyers and end users.

The production of organic milk for consumers is highly impacted by the economy. Because organic products, such as milk, typically cost more than conventional milk, a downturn in the economy often causes consumers to shift their spending habits in favor of less expensive food items. This adds additional variation and volatility in organic markets which, in turn, affects production.

Summary

Production of organic alfalfa and grass requires patience and persistence. Several years are often required to determine if a particular organic production technique will work successfully. For example, it may take three or more years before the full effects of a soil fertility program are realized and understood.

Organic farming has evolved over the years and, along with it, the views and attitudes of agriculturists and consumers have changed. The organic certification system has provided a clearer understanding of what organic means to agriculture and society. Additionally, these organic standards have resulted in more products and the labeling of these products that is more uniform and meaningful.

Certified organic agriculture has been impacted by and has had impacts on issues such as biodiversity, sustainability, soil fertility and soil health, pest management, farming practices and production systems, agricultural product marketing and markets, along with various social and environmental concerns. How organic and conventional agriculture will continue to evolve as viable, desired, and profitable production strategies will be enlightening. It will also be instructional to see if the philosophy and production practices of organic and conventional agriculture will converge rather than diverge over time.

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Organic Production Information

To learn more about the rules and regulations for organic production the reader is referred to the following websites:

Colorado Department of Agriculture, Organic Program
<http://www.colorado.gov/cs/Satellite/Agriculture-Main/CDAG/1167928162828>.

USDA-National Organic Program
<http://www.ams.usda.gov/AMSV1.0/nop>.

National Sustainable Agriculture Information Service, Organic Farming
<http://attra.ncat.org/organic.html>.

Organic Crop Improvement Association
<http://www.ocia.org/>.

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Additional Reading

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