

Crop Profile for Dairy Production in South Dakota

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General Production Information

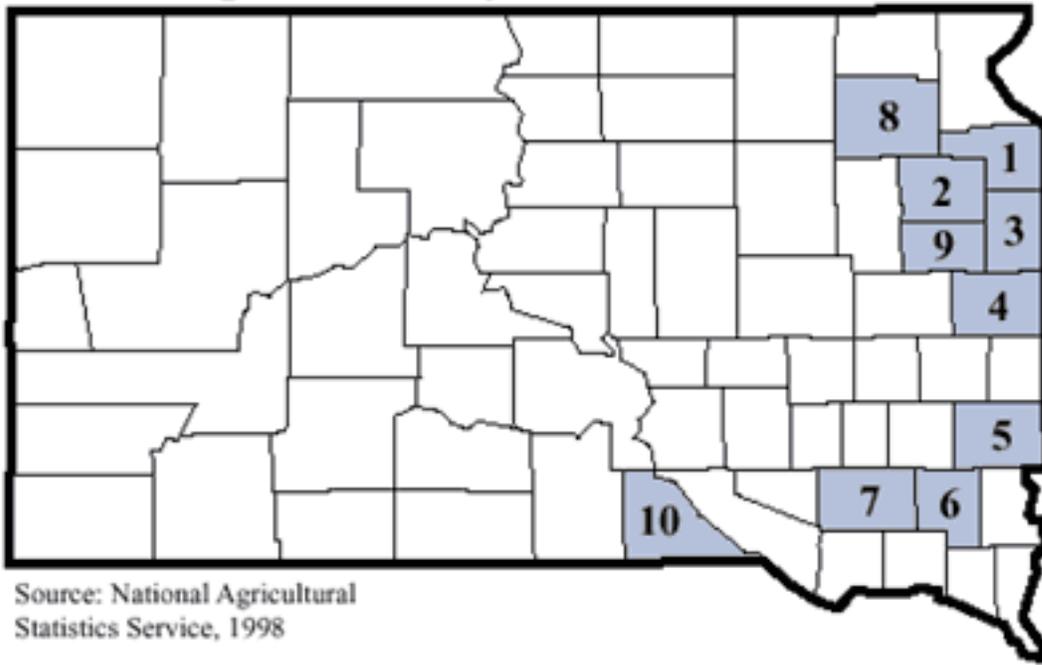
- South Dakota ranked 22nd in dairy production in the United States during 1997.
- South Dakota produced 1,435 million pounds of milk, or 0.9% of the national total production during 1998. This is an increase over the 1,384 million pounds produced in 1997.
- The average number of milk cows, at 102,000 head in 1998, was down three percent from 1997 and represented the record lowest number of dairy cows recorded in the state.
- Milk production per dairy cow, at 14,069 pounds in 1998, increased by 888 pounds per cow as compared to 1997. The national average production per cow was 17,192 pounds during the same year.
- Average milkfat production per cow was 519 pounds, or 3.69%.
- There were 1802 dairy farms in South Dakota during 1998.
- Of the 1,435 million pounds of milk produced in 1998, 1,421 million pounds were sold off-farm, with 85% of the milk sold in the state being used for cheese production.
- South Dakota produced 135.69 million pounds of cheese during 1998.
- Sale of dairy products produced 4.0% of the state total cash agricultural receipts during 1997, representing \$180,840,000 in total sales.
- Average price received for milk was \$15.50/cwt during 1998.

Cheese production information

- South Dakota produced 136,889,000 pounds of hard cheeses in 1998, representing 2% of the national total production.
- Other Cheeses produced include:
 - 60,779,000 pounds Italian cheese (2% of national total)
 - 55,697,000 pounds American cheese (2% of national total)
 - 43,230,000 pounds cheddar cheese (2% of national total)
 - 12,467,000 pounds of Colby, Monterey Jack cheeses (2% of national total)

Production regions--top ten producing counties

Top Ten Dairy Counties 1998



Cultural Practices

The North-Central Region is a strong dairy region in the United States. Four states rank in the nation's top ten for number of dairy animals and raw milk production, and six are in the top ten for number of dairy operations. In 1997, this region contained 38% of total U.S. milk cows, produced 36% of the milk, and was home to 54% of the dairy operations. South Dakota ranked as the 22nd largest dairy-producing state in the nation during 1997.

One reason the dairy industry is concentrated in the North-Central Region is that spring-fall temperatures and rainfall are suitable for grass, alfalfa and silage production. Temperatures for much of the year are also within the cow's thermo-neutral zone (5-25 °C). Thus, dairies in this region can make efficient use of cheap, summer forages and pasture, and cows housed in dry-lots experience favorable weather and can be provided with diets tailored to their individual needs and production potential. South Dakota follows along the regional trend as well, being a large producer (ranking 2nd in the nation) in alfalfa hay production and in production of other hay.

There are six main dairy breeds in the U.S., with the most popular being Holstein-Friesian and Brown Swiss. The others include Jersey, Guernsey, Ayrshire, and Milking Shorthorn. Holstein-Friesian is the most popular dairy breed in South Dakota.

The South Dakota dairy industry has seen a change in recent years as several large dairy operations of 750 to 1200 cows have been established in the eastern border counties. Dairy cattle numbers statewide, however, have decreased in recent history and reached record low numbers of 102,000 head in 1998.

Many of the new, large dairy herds entering the state in recent years are kept in loafing sheds and confined lots, but many cow herds are still on open pastures during summer months. However housed, dairy animals need to be kept clean and dry if they are to remain healthy. Straw or sawdust are common bedding materials for indoor confinement. Most operations apply their manure wastes to fields as fertilizer. Wastes must be removed from the animal environment to help control insect populations. The following table describes the manure management systems reported as used by South Dakota dairy producers:

Table 1. Manure Management Systems for South Dakota Dairy.

Type of handling system	Percent using
Percent using Manual/equipment scraping of barn	80.3
Automated barn cleaner with daily manure hauling	7.5
Automated barn cleaner with manure stockpiled	6.1
Floor flushing system	3.5
Manual/equipment scraping, then flushing	2.6
If using a flushing system, how often do you flush barns?	Percent using
Once Daily	0.0
2x/day	88.8
3x/day	11.1
4x/day	0.0
Other	0.0

Cows and heifers need shelter from the weather in the Midwest. Shelter may be from fences and tree shelter belts, but barns or other buildings are needed to protect cattle from severe winter weather. Many of the modern barns have walls made from plastic shades that may be automatically rolled up or unrolled, similar to green house systems, for temperature control. Older housing barns use windows and ventilation fans to regulate temperature. Younger calves may be housed in indoor pens, although single-calf hutches on grass pasture or feedlot areas combined with indoor housing is the most popular management method in South Dakota if calves are born in the spring. Approximately 1/3 (33.7%) of

South Dakota producers use indoor housing for calves only, 29.8% use individual calf hutches only, and 40% use a combination of both. Bedding material in South Dakota for calves includes straw (89.4%), sand (6.7%), wood chips (4.7%), shredded paper (1.6%), corn fodder (1.6%), and none (hutches placed directly on grass pasture) (1.6%). Management options for dairy cattle and heifers are listed in the following tables:

Table 2. Management options for dairy cows.

Option	Percent of producers
Free stalls with pasture/lot access	54.2%
Comfort stalls/stanchions with pasture/lot access	29.3%
100% confinement with free stalls	11.2%
Open lot or pasture only	2.8%
100% confinement with comfort stalls or stanchions	2.4%

Table 3. Management options for dairy heifers.

Option	Percent of producers
Open-front barn with pasture/lot access	68.6%
Dry lot/pasture only	16.9%
Free stalls with pasture/lot access	10.2%
100% confinement with free stalls	3.0%
Contract raised off-farm	1.3%

Water sources are important in South Dakota dairy operations. The largest-producing counties are along the eastern border of the state, along the area of the Big Sioux River. This area is underlaid with a large aquifer, the Big Sioux Aquifer, which provides ample water supply. The soils in this area, however, may be shallow and coarse in texture over the many side veins of the aquifer and over the main body of the aquifer itself. Special consideration of manure handling and application is required in this area to avoid

water contamination. Manure management plans are required of all new dairy facilities being built.

There are two main types of milking facilities (parlor or stanchion barn). A parlor facilitates stationary milking units while a certain number of cows enter to be milked. After this number are finished, they exit and a new set enters. These facilities can accommodate a very large number of cattle and are used in nearly all of the newer, larger facilities. These systems can feed grain during milking or all feeds can be fed outside the milking parlor. In a stanchion barn, all the cows are brought inside at once. The milking units moves between each pair of cows, until all cows are milked. Stanchion and loafing barns are the primary targets for pest control in dairy facilities.

Insect Pests

There are a variety of pests that affect cattle production, with the most severe problem varying with the season. Insect pests are a continual concern for dairy producers, and severe insect problems can have significant detrimental effects on milk production. During the winter, mites, lice, and grubs become a problem. In the summer months, flies are the most prevalent pest. A survey by the South Dakota Pesticide Impact Assessment Program, with results of a regional study included for comparison, showed the following insects to be the most commonly reported insect problems in dairy production:

Table 4. Pests reported as problems on dairy animals, South Dakota and regional

Pest	% of South Dakota farms	% of regional farms
Lice	27.4	47.8
Flies (General)	76.1	36.5
Horn Fly	11.4	24.9
Face Fly	7.8	NR ¹
Stable Fly	6.3	24.2
House Fly	1.6	28.2
Horse Fly	0.8	17.8
Deer Fly	NR	17.6
Worms (Internal)	10.6	10.6
Mosquito	7.1	NR
Mange	0.8	14.1

Cattle Grubs	0.8	3.6
Screwworm (Blackfly)	NR	14.8
Ticks	NR	13.5
Other	5.1	7.4

¹ *not reported*

PASTURE FLIES

Horn and face flies

Horn and face flies will not enter buildings or sheds in search of cattle, though they can remain on them when the cattle come indoors from the pasture. Attacks from these flies can be reduced by keeping cattle indoors, if this is an option.

Horn flies (*Haematobia irritans*)

Horn flies are blood-feeding flies that normally rest on the shoulders, back, neck, and head of cattle, though in the heat of the day, they often move to the belly. Cattle can withstand as many as 100-200 horn flies at any given time, but their presence in larger numbers may lead to reduced weight gain and resulting loss in milk production.

Face flies (*Musca autumnalis*)

Female face flies sit on the face and feed on secretions from the eyes, nose, and mouth of cattle. They may carry pinkeye though pinkeye outbreaks can also occur in the absence of face flies due to other vectors. Therefore, controlling face flies does not guarantee an absence of pinkeye. There are no estimates of how many face flies cause a reduction in the rates of animal growth or milk production. Stable flies (*Stomoxys calcitrans*) Stable flies are persistent pests of cattle and have been found more than 100 miles from their hatching site. They have a long, bayonet-like proboscis that causes a painful sting, and as few as five stable flies on the legs of cattle has been shown to reduce cattle performance. Since they usually choose to feed on the front legs of cattle, cows will often stand in circles with shoulders touching to deter stable fly attacks. They are a major problem in the summer for confined cattle (feedlots and dairies). Deterring attacks from stable flies is difficult since they live in and will readily enter buildings. Chemical sprays directed at the animals' legs may slow attacks but will not provide long-term control, especially in wet years when vegetation "washes" the pesticide off. Manure management and good sanitation are the best weapons against stable flies.

BITING FLIES

Horse flies (*Tabanus spp.*)

Deer flies (*Chrysops spp., Haematopota spp., Silvius spp., Pangonia spp.*)

Biting flies severely annoy cattle and can reduce the rate of weight gain. Control is difficult since the female fly lands on an animal, slashes the skin, takes a blood meal, and flies away to rest. This can be repeated up to 10 times before the female is satiated and leaves. Placing cattle in barns or sheds will keep horse and deer flies away since neither will enter buildings, but this may not be a viable option in states where range and pasture are the main sources of feed. It is possible to deter the feeding female with applications of permethrin, but this is a short-term control. There are no satisfactory long-term chemical controls for horse or deer flies. Cattle grubs/heel flies (*Hypoderma lineatum*) These flies are not as common in South Dakota but can be damaging. Animal tolerance for them is low. The mere presence of these flies upsets cattle, which reduces feeding, and animals sometimes injure themselves trying to avoid them. Adult flies lay eggs on hairs of animals in areas where it is difficult for the animal to dislodge them, such as the hocks of the hind legs or the front, ventral area. After hatching, the larvae then burrow under the skin and the life cycle continues inside the animal. Damage to the skin and meat from the burrowing larvae occurs and animal vigor is reduced. Control of this insect at the wrong time of the year (winter months) can also cause concern, as the larvae, when killed within the animal, will cause damage from their presence. Pour-on insecticides for control of this insect should only be used as directed.

CATTLE LICE

Lice Complex A (*Boricola* + *Linognathus* + *Solenopotes* + *Haematopinus* spp.)

Lice occur every year and affect cattle throughout the year, but are most commonly observed in the winter when cattle are housed or corralled together (the lice reproduction rate increases with the onset of cold weather). Low or moderate infestations do not have a significant effect on meat production (most animals can withstand moderate populations of lice before suffering a decrease in weight gain. However, lice-infested cattle are more susceptible to disease, particularly respiratory problems. High infestations on individual animals will reduce weight gain and may indicate sickness or internal parasites. Infestations of all lice in this complex are treated with the same insecticides, generally through pour-on products. Milk production of mature animals is also reduced when lice become severe.

Pesticides Used

Many different formulations of different active ingredients are available for use against lice, mites, internal parasites, and flies. Some formulations are available for use on lactating cows, whereas others are restricted to growing animals or their premises. Widely used formulations include topical pour-ons and sprays, slow-release ear tags, residual premise sprays, and knockdown aerosols. Some ingredients can also be delivered internally through injection or as feed additives.

The most widely used barn and space sprays contain short-lived pyrethrins, organophosphates (dichlorvos), and synergists (piperonyl butoxide or PBO). Some organophosphates (coumaphos, dichlorvos) and one of the pyrethroids (permethrin) are formulated for topical use, whereas others are

used as premise sprays (cyfluthrin). House flies developed resistance to DDT within the first five years of commercial use in the late 1940s, and this species is known to have developed resistance to most of the other compounds in commercial use, including the most recent pyrethroids. Resistance to pyrethrins is spotty, despite more than 50 years of commercial use. The most recently developed class of compounds is the avermectins (ivermectin, doramectin, eprinomectin), which have a broad spectrum of activity against lice, mites, and internal parasites.

Table 5. Top ten active ingredients used for dairy animals in the North Central Region and corresponding use in South Dakota.

Rank	Active ingredient	% of animals (region)	% of animal treatments in SD	Class of chemical
1	permethrin	16.6	37.2	Pyrethroid
2	eprinomectin	10.2	16.8	Avermectin
3	pyrethrins	6.8	0.5	Pyrethroid
4	coumaphos	6.7	9.1	Organophosphate
5	cyfluthrin	6.7	3.9	Pyrethroid
6	ivermectin	6.6	7.1	Avermectin
7	morantel tartrate	2.4	NR ¹	Acetocholine mimics
8	stirophos	2.2	NR	Organophosphate
9	dichlorvos	1.4	12.8	Organophosphate
10	doramectin ²	1.2	NR	Avermectin
Additional products important in SD				
	famphur		5.0	Organophosphate
	tetrachlorvinphos		4.8	Organophosphate
	methoprene		2.7	Insect growth regulator

¹ Not Reported

² Doramectin was not available as a product at the time of the South Dakota survey. It is in common use by producers today.

Table 6. Pesticides applied to dairy cattle in South Dakota through pour-ons.

Rank	Active Ingredient(s)	% of Total Pour-On Treatments	Class of Chemical
1	permethrin	40.0	Pyrethroid
2	eprinomectin	29.9	Avermectin
3	ivermectin	10.6	Avermectin
4	famphur	9.1	Organophosphate
5	cyfluthrin	7.1	Pyrethroid
6	fenthion	2.2	Organophosphate
7	dichlorvos	1.2	Organophosphate

Table 7. Pesticides applied to dairy cattle in South Dakota through ear tags.

Rank	Active Ingredient(s)	% of Total Tag Treatments	Class of Chemical
1	cyfluthrin	26.9	Pyrethroid
2	cypermethrin-s/PBO ¹	20.7	Pyrethroid/synergist
3	fenthion/PBO	10.3	Organophosphate/synergist
4	diazinon	10.2	Organophosphate
5	chlorpyrifos/PBO	8.9	Organophosphate/synergist
6	permethrin	5.7	Pyrethroid
7	lambda cyhalothrin/ pirimiphos-methyl	5.3	Pyrethroid/organophosphate
8	chlorpyrifos/diazinon	5.3	Organophosphate
9	chlorpyrifos/ permethrin/PBO	1.3	Organophosphate/ pyrethroid/synergist

It is important for cattle producers to manage ear-tag use effectively. Insect resistance to pyrethroid insecticides has been well documented. To maintain effectiveness of ear tags, it is important for producers to rotate between a pyrethroid tag and an organophosphate tag. Combination tags containing an organophosphate and a pyrethroid in a single tag are available and are used by some producers, as is

shown in the table above. From a resistance management standpoint, however, this practice is not recommended. Exposure to both classes of insecticide at the same time may lead to cross resistance in the insect population that is not manageable with current ear tags.

Table 8. Pesticides applied to dairy cattle in South Dakota through area sprays.

Rank	Active ingredient(s)	% of total animals in facility treatments	Class of chemical
1	dichlorvos	49.4	Organophosphate
2	permethrin	48.1	Pyrethroid
3	malathion	2.5	Organophosphate

Non-Pesticide Insect Control

Table 9. Non-pesticide insect control measures used by dairy producers in South Dakota.

Rank	Method	% of producers indicating
1	Timely manure management	76.1
2	Fly traps	19.6
3	Electrified screens	9.0
4	Burning pastures	1.6
5	Biological control ¹	0.8
6	Other	0.8

¹ Parasitic wasps reported as tried by one producer

References

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Contacts

Insects

Dr. Mike Catangui, Extension Entomologist,
239 Ag Hall, Box 2207A,
South Dakota State University,
Brookings, SD, 57007-1096,
catangui.michael@ces.sdstate.edu

PIAP

Brad Ruden, Extension PIAP,
241 Ag Hall, Box 2207A,
South Dakota State University,
Brookings, SD, 57007-1096,
ruden.brad@ces.sdstate.edu

Pesticide Applicator Training/Education

Jim Wilson,
237 Ag Hall, Box 2207A,
South Dakota State University,
Brookings, SD, 57007-1096,
wilson.james@ces.sdstate.edu