GROWING MILKWEED IN VERMONT
AN ECONOMIC CASE STUDY

By Lynn G. Knight, Economist, USDA NRCS East National Technology Support Center and Suzy Hodgson, University of Vermont Extension.

USDA Northeast Climate Hub
U.S. DEPARTMENT OF AGRICULTURE

THE UNIVERSITY OF VERMONT EXTENSION

This case study is based on primary and secondary data collected through both published sources and interviews with farmers, ecologists, and University of Vermont Extension staff.

Specific crop and production data were collected from Borderview Farm in Alburgh, Vermont. Data were collected through Borderview Farm milkweed trials undertaken by University of Vermont Extension's Northwest Crops and Soils team in 2017 and 2018.

Additional information was collected through interviews with the Farm Between in Jeffersonville, Vermont, Ernst Conservation Seeds, Natural Fibers Corporation, and UVM Extension's Northwest Crop and Soil Program Coordinator.

INDEX

INTRODUCTION

Over the past 10 years, farmers have shifted their views on milkweed from a weed to a potentially valuable plant.

In Vermont, several farmers have gained a new appreciation for common milkweed (*Asclepias syriaca*). They are encouraging it for its pollinator benefits and even intentionally cultivating it as a crop for its floss and seed. This plant has some potential for Vermont farms seeking to diversify and adapt to a changing climate. In this case study, we look at approaches and related costs and benefits to growing milkweed. We provide an economic analysis of milkweed seed and floss production and look at potential demand.

This study can inform agricultural producers of a potential alternative crop opportunity. One climate change strategy is to increase crop diversi-fication by adding new perennial crops. This reduces the risk of any one crop failure having significant impact on a farm's bottom line. Promoting milkweed production not only provides monarch butterfly habitat, but it also holds potential as an alternative crop for Northeast producers.

(Cover image) Monarch caterpillar on *Asclepias* sp. leaf at Chichaqua Wildlife Area, July 20, 2019. | USDA/NRCS photo by Darren K Manthei ▲

Monarch 5th instar larva feeding on butterfly milkweed (*Asclepias tuberosa*) in Payne County, Oklahoma. | USDA/NRCS photo by Ray A. Moranz ►

Milkweed plants are the primary native hosts for the monarch butterfly. It is the only food source for their caterpillars in the northeastern United States.

Over the past 20 years, monarch numbers have experienced steep declines. This is due to many interacting environmental factors.[1] These include changing climate patterns and much of their native milkweed habitat being removed through urban sprawl and modern farming practices.[2] One main cause for the declining eastern monarch butterfly numbers is believed to be the loss of milkweeds. This is partly due to the use of herbicides to control weeds in herbicide-tolerant crops.[3] Monarchs have also been facing more extreme weather events during breeding and migration. Milkweed and monarchs have attracted wide public interest and attention with the monarch butterfly considered a flagship species for engaging the public in conservation efforts.

In 2014, the U.S. Fish and Wildlife (USFWS) Service was petitioned to list the North American population of monarchs as threatened under the Endangered Species Act. The USFWS determined that Endangered Species Protection was "warranted" in December 2020 and has put monarch butterflies on a waiting list to be reviewed annually. Many conservation groups have been helping monarchs by teaching habitat conservation programs and through research.[4] These groups include Monarch Watch, the Monarch Lab, the Xerces Society, and Monarch Joint Venture - a partnership of government agencies, businesses, NGOs, and academic institutions.

In 2015, the White House outlined a national strategy to promote pollinators. This included a target to, "Increase the Eastern migratory population of the monarch butterfly to 225 million butterflies."[5] The US Department of Agriculture (USDA) worked with the USFWS and partners to include monarchs among its target conservation species. They also provided technical and financial assistance for farmers to plant milkweed and other nectar-rich plants. Funds and advice are available from USDA's Natural Resources Conservation Service. More recently, other organizations such as Environmental Defense Fund, Environmental Incentives, and the Monarch Lab at the University of Minnesota have been working together to set up programs such as the Monarch Butterfly Habitat Exchange.

These efforts to restore milkweed habitat may have helped contribute to a rebound of eastern monarch populations. Monarch numbers increased from 2018 to 2019 when the largest population was recorded in 2007.[6] Favorable weather conditions for monarch breeding in 2018 were also believed to be factor.[7]

In addition to monarchs, milkweed flowers support other pollinators such as honeybees and provide habitat for beneficial insects that control the spread of destructive insects. More than three-quarters of global food crops rely to some extent on animal pollination for yield and/or quality. Pollinator-dependent crops make up 35 percent of global crop production volume.[8] Beyond value to crops, a valuation study of monarchs indicated that U.S. households valued monarchs between $4.78 and $6.84 billion. This is a value level similar to endangered vertebrate species.[9]

[1] Agrawal, AA. Advances in understanding the long-term population decline of monarch butterflies. https://doi.org/10.1073/pnas.1903409116.

[2] USDA NRCS Monarch Butterflies

[3] Pleasants, JM, Oberhauser, KS. Milkweed loss in agricultural fields because of herbicide use: effect on the monarch butterfly population. https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1752-4598.2012.00196.x

[4] 2017 Monarch Conservation Implementation Plan

[5] National Strategy to Promote the Health of Honey Bees and Other Pollinators

[6] Eastern Monarch Population Numbers Increase 144% from Last Year [7]

[7] Personal conversation, Ray Moranz and Chip Taylor

[8] Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), 2016.

[9] Diffendorfer, J. (2013) National Valuation of Monarch Butterflies indicates an Untapped Potential for Incentive-based Conservation, Conservation Letters, A Journal of Society for Conservation Biology. https://onlinelibrary.wiley.com/doi/abs/10.1111/conl.12065

Milkweed floss is the fiber attached to the seed within the milkweed pod. The floss had been used historically and has potential for use today.

Milkweed floss was a critical material used during the Second World War when the kapok supply for life preservers was cut off due to the Japanese invasion. US Navy tests found that about a pound of milkweed floss could keep a 150 lb. person afloat for over 40 hours.[10] To support the war effort, school children were encouraged to collect milkweed pods for processing into life preservers through cooperation with the US Office of Education. A retired NRCS employee reminisced about collecting pods as a child and bringing them to the local movie theater. He remarked that one gunny sack of pods would get him a ticket to the movies. A processing plant was built in Michigan and over the course of the war enough milkweed was collected to fill 1.2 million life preservers used in the war effort. Unfortunately, at the end of the war synthetic and petroleum-based materials were developed and replaced milkweed floss use.

There has been increased interest in commercial milkweed production in recent years. Prototype suits are being tested by the Canadian Coast Guard for water rescue use. High end performance clothing companies are researching the use of milkweed floss as a replacement for synthetic fibers for insulation. Floss is used as a more sustainable, natural, and hypoallergenic filler for bedding.[11] Milkweed floss is also being researched as a promising filler for absorbent hazardous material containment booms as it can be wrung out and reused. While these are some examples of the many promising uses for this natural fiber, at this time there is no reliable market developed for this product.

[10] Wykes, G. (2014) A weed goes to war, and Michigan provides the ammunition. https://www.mlive.com/news/2014/02/a_weed_goes_to_war_and_michiga.html

[11] Siler, Wes. 4/16/2015. Could Humble Milkweed Replace Down Feathers In your Outdoor Gear? https://gizmodo.com/could-humble-milkweed-replace-down-feathers-1698295598

Milkweed floss and seeds. | Photo by Suzy Hodgson

▲ The weight of a milkweed pod varies between .005-.009 lbs. (distribution: pod shell 36-43%, floss 17%-24%, seeds 40%). | Photo by Suzy Hodgson

Over the past decade, conservationists have promoted various milkweed species as an essential feature of monarch and other pollinator habitat. However, farmers and farm supply companies have paid more attention to common milkweed in terms of saleable products such as the floss and the seeds.

Recently, textile, fabric, and clothing companies have been developing new products with the floss fiber from the milkweed pod. The floss's hollow fibers have a number of material properties and high thermal efficiency attributes. These include being light weight and water repellent, and having high tog values (i.e., measurement of insulating capacity).

Debbie Dekleva is a milkweed entrepreneur of Natural Fibers Corporation (now known as Monarch Flyway), the largest USA producer of milkweed products. Ms. Dekleva compares the milkweed fiber to goose down in terms of some of its material attributes. Her family company is developing new and sustainable methods of using the floss for different products and uses. Her company has paid $0.60 per pound for pods, but in 2019 had a greater supply of floss than her company needed.[12] Milkweed floss is an emerging market so a small number of producers and buyers in the marketplace can easily shift the supply and demand for floss. Therefore, the market price for floss from pods has been highly variable.

The other potential milkweed pod product is the seed, which makes up the bulk of the pod weight. Farmers in Vermont have harvested the seed from their milkweed plants either by an adapted combine and vacuum separator (Borderview), or by hand collection (The Farm Between). The overall market for conservation seeds is greatly influenced by the demand from USDA Farm Bill conservation programs. A small number of farmers have been able to sell their seed retail at about $200 per lb. or wholesale at about 35% of the retail price. Debbie Dekleva confirms that the demand for seed to plant milkweed for conservation is driving the market price.

[12] Phone conversation with Debbie Dekleva - October 15, 2019.

The Farm Between | Jeffersonville, Vermont

The Farm Between in Jeffersonville, Vermont, is an organic fruit nursery specializing in fruit trees, berry bushes, and pollinator plants. The Farm Between, now owned and run by Stirling College, was formerly owned and managed by Nancy and John Hayden for 28 years. Over the years, the Haydens cultivated and sold cold hardy and disease-resistant nursery plants including apple trees, elderberry bushes, currants, gooseberries, aronia berries, blueberries, and raspberries.

In early 2000s when the Haydens planted perennial fruits pollinators were missing. Nancy stated, “We noticed that we didn’t see pollinators. In the 1990s, we had plums and cherry trees which had been buzzing with bees and other insects, but in the 2000s, nothing was out there. So, we started what we call a pollinator sanctuary and turning places we could into pollinator stands of milkweed, asters, and goldenrod.”

Through research and education, Stirling College is continuing to build on the Haydens’ goals of increasing pollinators and improving biodiversity for the fruit nursery and apple orchard. Their plan was to encourage milkweed and other pollinator plants in their meadows by creating a small-scale pollinator reserve. To do this, they stopped mowing the pasture. This allowed the meadows’ goldenrod, asters, milkweed and other native plants to flower. These are an important forage resource for pollinators. A strategy of early season grazing keeps down weeds, allowing milkweed--which emerges later--the chance to become established.

In 2011, Tropical Storm Irene was a turning point for the farm. As the Haydens describe, “(Tropical Storm) Irene was a decisive moment for us as we lost our annual crops, so [we] decided to turn to perennials.” The common milkweed’s horizontal creeping root system and perennial crown helps the plant survive summer wet or dry weather variability during its first year after planting. Roots can grow deep as well as wide with horizontal roots reaching up to 10-feet laterally in a single season. A piece of root 1-inch in length can produce a new plant.[13] The long-lasting blooms in the third-year support pollinators with seed pods developing in late summer. The Farm Between grows several species of milkweed in addition to the common milkweed.

[13] Ohio Perennial and Biennial Weed Guide

Borderview Farm | Alburgh, Vermont

Borderview Farm, owned by Roger Rainville, has been cultivating a milkweed crop on 10 hectares (about 25 acres) for the past four years with the technical support of the University of Vermont (UVM) Extension Northwest Crops team. This UVM research team has been studying different soil preparation techniques, seeding rates, and planting methods for common milkweed. Research continues to determine the best methods for growing this milkweed.

The preferred seeding rate for growing common milkweed as a crop ranges from 3 pounds per acre as recommended by Quebec producers to 6 pounds per acre as indicated by UVM's research. The Quebec seeding rate of 3 pounds per acre at Borderview Farm produced only 0.093 plants per square foot. Doubling this rate to 6 pounds per acre resulted in a proportionately much higher number of milkweed plants, 0.56 plants per square foot as measured on September 29, 2017, 68 days after planting. These tests also revealed that germination time is highly variable from a few days to more than two weeks.

For establishment of production fields, Ernst Conservation Seeds, Pennsylvania confirmed that they apply to their own fields and recommend to others a rate of 6 pounds of common milkweed seed per acre. Ernst also recommends fall planting for higher germination rates. For meadow (not commercial seed production) plantings, Ernst Conservation Seeds recommends using 0.3 to 0.4 pounds per acre for Swamp or Butterfly Milkweed and 0.1 pounds per acre for Common Milkweed as part of a seed mix for pollinators.

Compared to other crops, harvesting the very lightweight milkweed floss is a large challenge. For this purpose, Roger Rainville has re-engineered and adapted one of his combines to harvest the milkweed pods and separate the seed from the silk floss. His time estimate for adaptation of the harvester was between 200 to 300 hours in research and development plus $2,000 in the purchase of a vacuum system.[14] According to Ernst, most milkweed seed is mechanically harvested. Given the expense of combines, secondhand equipment is typically used. While there are many combines that can be used to harvest milkweed, Ernst prefers to use the Gleaner K, L, or M series. In 2018-19, used combines of this type cost around $25,000. Over time, however, they will be increasingly difficult to locate as they are no longer manufactured.

[14] E-mail correspondence with Roger Rainville - October 23, 2018

(Page 8) A bee and Monarch butterfly near the U.S. Department of Agriculture Farmers Market in Washington, D.C., on August 6, 2018. | USDA photo by Lance Cheung ▲

(Page 9) Lynn G. Knight and Suzy Hodgson take a closer look at milkweed stand at Borderview Farm in 2018. | USDA Northeast Climate Hub photo by Karrah Kwasnik ▲

Milkweed plants at Borderview Farm, May 22, 2018. | Photo by Suzy Hodgson ▶

POTENTIAL USE FOR MILKWEED FLOSS

Milkweed floss is the fiber attached to the seed within the milkweed pod. The floss had been used historically and has potential for use today.

Farmers growing milkweed for the floss can join the Canadian Co-operative. The Monark Cooperative makes available to its member-producers:

- Purchase contracts of 10 hectares (24.71 acres)
- Harvesting equipment
- Dryer service
- Seed stock
- Access to a network of growers and stakeholders who all work to promote milkweed
- Opportunity to pool resources and skills to support each stage of production, from field preparation to the sale of their crop.

In the past, the Co-op sold floss to product manufacturers such as the Canadian company Fibres Monark, which produced high-end jackets insulated with milkweed floss. The company had been providing jackets, coveralls, gloves and mittens to the Canadian Coast Guard for performance evaluation. Retail products were sold via the Canadian retailers Quartz and Altitude Sports. However, the Fibres Monark Company has since been dissolved, and this marketing link no longer exists.
In Vermont, designers have made custom jackets filled with milkweed floss sourced in Nebraska. These have been made in small batches for women's wear. As a new fiber, the floss is currently under research and testing with product designers. Roger Rainville continues to seek new marketing opportunities for Vermont milkweed fiber and although he continues to follow potential leads, he cautions that there is currently no established market.

◄ UVM Extension Kimberly Hagen wearing her May West milkweed jacket. Jacket designed by Charlotte X.C. Sullivan and Alayna Rasile Digrindakis with batting produced by Monarch Flyway. | Photo by Suzy Hodgson

As an emerging crop in Vermont agriculture, common milkweed could be promising for crop diversification, but there remains a fair amount of uncertainty surrounding the best growing methods.

The potentially high-value product is the floss contained in the milkweed pods with secondary income from seed. Hence, maximizing flowering and pod production is clearly the goal for floss farmers. However, UVM Extension trials have observed that on average, 26% of the plants in an established milkweed field form no pods and hence there is no floss harvested from these plants. This is likely due to the way that milkweed plants continue to produce new shoots from root buds over time, leading to inconsistent plant maturity across the field.

Importantly, fields planted in common milkweed take three years before any pods form on the best of plants. Recent UVM Extension studies found no increase in the number of milkweed pods or floss yield with applications of supplemental nitrogen or potassium. However, this may vary depending on the baseline fertility of the given soil. Variable Vermont weather with shifting growing seasons and increasingly high precipitation can result in milkweed plants at highly variable stages of maturity (e.g. plant height, flowering timing). For example, plants in 2019 compared to those in 2018 were two weeks behind in their flowering phenology.

As a perennial crop, the main costs are associated with the first year of planting; benefits won't be realized until the third year at pod harvest. First-year costs include soil preparation and seeding. Mr. Rainville stated that milkweed establishment operations and costs are the same as planting corn with the exception of seeding cost. He also confirmed that commercially available milkweed seed cost about $120 per pound. Given the recommended seeding rate of 6 pounds per acre, this amounts to $720 per acre.

Crop costs in the 2nd year can be minimal, and in the 3rd year the bulk of costs are associated with harvesting. Most milkweed plants will continue to produce flowers and pods in subsequent years. As a monoculture, however, UVM Extension expected that a crop rotation may be needed by year 7. If milkweed is planted as a seed mix strictly for monarch butterfly and pollinator habitat, then no harvesting costs would occur. Financial assistance could be available to agricultural producers through 2018 Farm Bill conservation programs.

Roger Rainville stated that common milkweed monoculture establishment costs are similar to corn as he used the same equipment, inputs and operations. The only difference was the seed. Based upon ERS Corn Cost of Production values, Table 1 shows estimates of the cost of establishing a pure milkweed stand and an average annual cost for comparing any potential returns. While corn is an annual crop, milkweed is a perennial crop; establishment costs can be averaged over the 7-year assumed life of the milkweed crop. Average costs of growing and harvesting milkweed over 7 years are estimated to be $567 per acre per year.

▲ Established milkweed stand at Borderview Farm | USDA Northeast Climate Hub photo by Karrah Kwasnik

TABLE 1. MILKWEED PRODUCTION BASED ON ERS 2016 CORN PRODUCTION COSTS AND RETURNS IN US DOLLARS PER PLANTED ACRE - NORTHERN CRESCENT MILKWEED
(assumed establishment costs other than seed the same as corn)

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7
OPERATING COSTS							
SEED [Monark's price of $120/lb for members]	$720.00	0.00	0.00	0.00	0.00	0.00	0.00
FERTILIZER [a]	$118.60	0.00	0.00	0.00	$118.60	0.00	0.00
CHEMICALS	$31.60	$31.60	$31.60	$31.60	$31.60	$31.60	$31.60
CUSTOM SERVICES [b]	$28.75	0.00	0.00	$28.75	$28.75	$28.75	$28.75
FUEL, LUBE & ELECTRICTY	$29.77	$29.77	$29.77	$29.77	$29.77	$29.77	$29.77
REPAIRS	$29.34	$29.34	$29.34	$29.34	$29.34	$29.34	$29.34
INTEREST ON OPERATING CAPITAL	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50
TOTAL, OPERATING COSTS	$961.12	$94.12	$94.12	$122.96	241.12	$122.96	$122.96
ALLOCATED OVERHEAD							
HIRED LABOR	$3.59	$3.59	$3.59	$3.59	$3.59	$3.59	$3.59
OPPORTUNITY COST OF UNPAID LABOR	$28.67	$28.67	$28.67	$28.67	$28.67	$28.67	$28.67
CAPITAL RECOVERY OF MACHINERY AND EQUIPMENT	$105.41	$105.41	$105.41	$105.41	$105.41	$105.41	$105.41
OPPORTUNITY COSTS OF LAND	$120.81	$120.81	$120.81	$120.81	$120.81	$120.81	$120.81
TAXES AND INSURANCE	$13.93	$13.93	$13.93	$13.93	$13.93	$13.93	$13.93
GENERAL FARM OVERHEAD	$25.41	$25.41	$25.41	$25.41	$25.41	$25.41	$25.41
TOTAL, ALLOCATED OVERHEAD	$297.82	$297.82	$297.82	$297.82	$297.82	$297.82	$297.82

TABLE 1. MILKWEED PRODUCTION BASED ON ERS 2016 CORN PRODUCTION COSTS AND RETURNS IN US DOLLARS PER PLANTED ACRE - NORTHERN CRESCENT MILKWEED
(assumed establishment costs other than seed the same as corn)

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7
TOTAL COSTS	$1,258.94	$392.03	$392.03	$420.78	$538.94	$420.78	$420.78
FOREGONE INCOME [corn]	$603.20	$603.20	$603.20	$603.20	$603.20	$603.20	$603.20
TOTAL, COSTS WITH FOREGONE INCOME	$1,862.14	$995.23	$995.23	$1,023.98	$1,142.14	$1,023.98	$1,023.98
AVERAGE ANNUAL COST [7 years, 2% interest]	$566.94						

NOTES: Source: USDA, Economic Research Service using data from USDA's Agricultural Resource Management Survey and other sources.

Survey base years are those in which a survey of producers was conducted. These years provide a baseline from which estimates in subsequent years are set. The regions are ERS Farm Resource Regions.

[a] Cost of commercial fertilizers, soil conditioners, and manure. | [b] Cost of custom operations, technical services, and commercial drying.

The milkweed plant has a range of benefits. These include its conservation value as monarch habitat, its pollinator services attracting pollinators for many crops, and its potential as a crop itself for the seed and floss fiber.

Pollinator surveys at Borderview Farm in 2018 and 2019 show that honeybees are the predominant visitor followed by worker bumble bees.

"Notable sightings included *Bombus terricola*, a species listed as threatened in Vermont and *Bombus fernaldae*, representing the fourth record of this species in Vermont." The study also included monarch butterfly egg, larvae, and adult counts for both years. However, extrapolating these sample counts to estimate a total population can prove difficult.

Monarch butterfly habitat is an important secondary benefit to milkweed production. Therefore, we estimated a range of potential butterfly numbers based on the 2020 Grant et al. study. This study estimated monarch butterfly production on habitat in Ontario that have similar climatic conditions as Borderview Farm. Grant's study found that monarch butterfly egg to adult survivorship ranged from a low of 0.008 (adults per egg) to a high of 0.025. The study also estimated the number of adults produced per 6,809 stems of milkweed, from a low of 1 to a high of 29 adults. Using these estimates, Table 2 shows the results of the number of estimated adult monarch butterflies based on monarch egg counts and an estimated number of stems of milkweed from the 2018 and 2019 pollinator studies. These were extrapolated to per acre, and total per farm values. Based on plant density per acre and the assumptions above, it was estimated that there were between 13 to 450 adult monarchs produced per acre.

Although it is clear that a number of adult monarchs can be produced on a pure stand of milkweed, additional study would have to occur to get more accurate counts. It was noted in the 2-year study that there were no observed signs of predation of eggs or larvae. Additional years of pollinator study would need to occur to determine whether or how much predation would increase over time.

TABLE 2. BORDERVIEW FARM ESTIMATED MONARCH BUTTERFLY COUNT BY EGG SURVIVORSHIP AND NUMBER OF MILKWEED STEMS, 2018 & 2019

	PER ACRE		FARM TOTAL [10 Hectares]	
YEAR	2018	2019	2018	2019
MONARCH EGG	1,636	12,891	56,583	445,959
ADULT MONARCHS PRODUCED [based on low and high estimates]				
BASED ON OBSERVED EGGS	13 to 41	103 to 322	453 to 1,415	3,568 to 11,145
BASED ON NUMBER OF STEMS MILKWEED	14 to 418	16 to 450	499 to 14,460	537 to 15,569

The monarch sampling method changed on Borderview Farm between 2018 and 2019. There was concern that the 2018 sample size was inadequate in order to estimate butterfly populations. Therefore, sampling size was increased for 2019. It is uncertain whether the large increase in number of observed monarchs between the two years is due to inadequate sampling in 2018, or to the fact that 2019 may have been an unusually good year for monarch butterfly production.

It must be noted that there is no guaranteed market for floss or seed, and demand can vary significantly. This makes the marketing of milkweed products extremely uncertain at this time.

The ability to mechanically harvest common milkweed pods and separating the floss from the seed would ultimately save harvesting time and labor. Mechanical harvesters are not currently commercially available. Adapting other harvesting equipment such as a combine has the potential for much higher returns. Separating floss and seeds from the pods could yield between 105 lbs. and 175 lbs. of floss, and 235 and 391 lbs. of seed per acre. This assumes a fairly high rate of harvest loss (50% for seed and 30% for floss).

Pod harvesting costs can vary greatly depending upon whether the pods are hand-picked or mechanically harvested. As harvesting costs may be the highest cost associated with milkweed production, this can have a significant impact upon potential profitability.

Table 3 shows estimated yields of milkweed pods, floss and seed based on the 2018 and 2019 production trials on Borderview Farm. Pod production ranged from about a ton (2,028 lbs.) to about 1.7 tons (3,380 lbs.) per acre.

TABLE 3. ASSUMED HIGH, MEDIUM, AND LOW YIELD OF MILKWEED PRODUCTS

	POUNDS PER ACRE [30% Dry Matter basis]		
GROSS PRODUCTION	**PODS**	**FLOSS**	**SEED**
MILKWEED HIGH ESTIMATE	3,380	175	391
MILKWEED MEDIUM ESTIMATE	2,704	140	313
MILKWEED LOW ESTIMATE	2,028	105	235

Source of production data from combining yields from 2018 & 2019 Borderview Farm production trials. Harvest loss assumptions based upon email correspondence with Heather Darby stating that harvesting will lose 50% of seeds and 30% of floss

Pods are sold at 30% moisture, floss weight estimated to be 17% of pod weight, with 40% floss capture with mechanical harvesting equipment.

As with any new crop, the current commercial milkweed market should be considered extremely risky from an economic standpoint.

There are many risks associated with the growing and harvesting of milkweed plants. These include variable availability and price of seed, seeding rates, planting methods, germination rates, and plant pod maturation. Harvest yields, as well as floss and seed capture rates also vary. Harvesting costs differ from labor intensive hand-picking to equipment modifications that separate floss and seeds from pods. While this study did not focus on floss and fiber processing, there also are uncertain and potentially high costs in the textile manufacturing process.

On the demand side, the most important consideration is that the markets for both milkweed seeds and floss—and the potential products made from floss—are highly unpredictable. This is because milkweed, as a commercial crop, is still in its infancy.

Despite these risk factors, common milkweed has the potential to be a more viable crop over time. More research is needed, successful growing methods need additional documentation, and markets need to become more established. What remains clear is the importance of cultivating a variety of milkweed species for pollinators and monarchs. Current research shows that milkweed production can provide substantial monarch butterfly and other pollinator habitat and helps increase numbers of these beneficial and desirable insects.

Milkweed flower buds | Photo by Suzy Hodgson

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