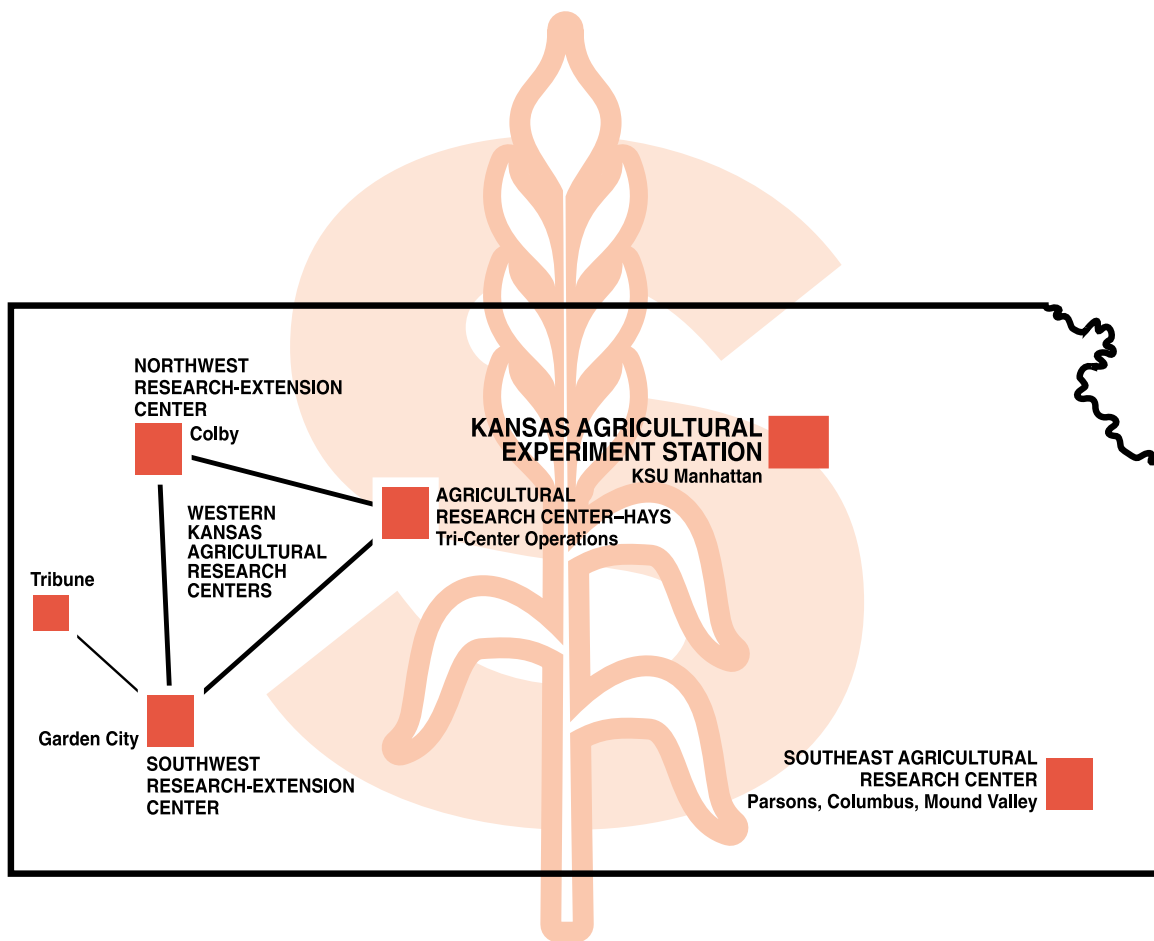


Economic Issues with Echinacea



Agricultural Industry Competitiveness

Enhance the Value of Kansas Agricultural Goods

Economic Issues with Echinacea

The farm-level value of herbs produced in North America is more than \$1 billion, with the market growing at least 10 percent annually (International Research Institute). As the herb industry grows, markets for some crops are maturing and others are just being commercialized. One herb with an established market is echinacea, commonly known as purple coneflower. It is native to the central United States. Recently some Kansas producers have started producing herbal crops as an alternative enterprise. The objective of this publication is to describe characteristics of echinacea and discuss their implications for Kansas producers.

Description and Uses

There are nine known species of echinacea with three having commercial importance, *E. purpurea*, *E. angustifolia* and *E. pallida*. The dried root is the major medicinal product, but the leaves are sometimes also harvested. Echinacea is regarded as a nonspecific stimulant of the immune system, as an anti-inflammatory for the prevention or treatment of cold and flu symptoms, and as an aid in wound healing. Traditionally, it has been used as a remedy against infections, treating poisonous snakebites, and for wound healing. Native Americans have used echinacea for its medicinal value for generations.

In recent years, Europeans have used echinacea in mainstream medicine, with more than 300 preparations containing echinacea being sold including ointments, lotions, creams, tinctures, liquid and dry extracts, and toothpaste. In the United States the demand for herbs such as echinacea also has been increasing.

Production Practices

In the United States the production of echinacea has been both by cultivation of mostly *E. purpurea* and the digging of native plants (in Kansas, usually *E. angustifolia*). In recent years, the cultivation of echinacea has become an important

topic for producers seeking alternative crops. However, there are few comprehensive sources of information. Echinacea growers differ on production practices. There is no central clearinghouse to share what they have learned. Most producers agree that echinacea grows best on fertile, free-draining soils with a pH range from 6 to 8. However, even these basic requirements are not universally agreed upon. In New Zealand, a pH of 5.5 to 6 has produced *E. purpurea* with good results, while *E. angustifolia* seems to prefer a more alkaline soil. All producers agree that a soil texture easily washed off the roots is very important.

Planting

Planting and establishing echinacea is where each grower seems to have individual methods for success. Some recommend planting in the spring, but Kansas growers seem to prefer fall planting. For a crop with seed costs ranging from \$50 to \$500 per pound, some growers believe transplanting is best to ensure uniform and consistent plants. Others feel they can get an adequate stand through direct seeding with a precision planter, which also allows for higher plant densities than transplanting. All are in agreement that learning how to establish a good stand of plants takes a great deal of experimentation and practice. One grower reported only 12 plants survived out of 8,000 transplants.

Echinacea seed has to be stratified and carefully handled before it will germinate. Even then, the germination may be as low as 20 to 30 percent.

To help get transplants established, some form of irrigation is needed. Since echinacea are native Kansas species, they are drought tolerant after establishment. However, drip irrigation could be used to ensure that such a high-value crop is produced. Even brief periods of drought could reduce yield and quality, especially during the maturation process.

Plant spacing, both in rows and between rows, has many recommendations ranging from about 10,000 plants per acre to more than 50,000 per acre. Often growers first plant with wider spacing and then change to narrower rows and more plants in the rows.

Growing

Since it is a perennial crop, initial costs to establish echinacea are significant the first year. Costs for the following years are minimal, except for harvesting. Echinacea plants are at least 3 years old before roots are harvested. Roots are commonly harvested the third year. If growing conditions have not been ideal or the market price is low, harvest may be delayed.

During the first year, controlling weeds is an important consideration. There are no herbicides labeled for echinacea. Most Kansas growers are organic growers and do not use herbicides. Much time and effort is spent controlling weeds with mulches, hand pulling, and hoeing. One grower estimated that 80 percent of producers who plant echinacea never harvest a crop because of the labor intensive weeding. One large commercial grower indicated that grass killers and Roundup wick equipment were used. Cultivation destroys weeds and increases soil aeration.

Wider plant spacing that allows for mechanical tillage appears to hurt the echinacea plants as they lodge, which is one reason many growers have decreased the plant spacing and have higher densities per acre. Another reason for denser plantings is that in the second and third growing seasons the echinacea plants have developed thick canopies that discourage weed growth.

Mulches to control weeds have been used with varying degrees of success. Black plastic mulch controls weeds, but at harvest, the roots might have more rotting. Organic mulches, such as straw, have had some success. Landscape fabric seems to have some potential to control weeds. One

grower thought green mulch, such as crabgrass in the summer and winter perennials like henbit and chickweed, did not hurt echinacea. All growers agree that weed control is very important.

Fertilizer requirements are not agreed upon. German growers apply about 50 pounds per acre of actual nitrogen, 30 pounds per acre of actual phosphorus and 70 pounds per acre of actual potassium. One Kansas organic grower uses compost, fish, and gypsum, while another grower did not use much fertilizer as long as the soil Ph is close to 8.

A monoculture growing system with intensive production practices can create insect and disease problems. These problems rarely exist in species of plants like echinacea that grow in their native habitat. Some Kansas echinacea growers have reported “yellows” disease problems. This disease is transmitted by leaf-sucking insects.

Harvesting

There are three distinct parts of the echinacea plant that are harvested: seeds; leaves and stems; and roots. Seeds may be harvested during the second and third years. There is great demand for seed, especially *E. angustifolia*, which is native to Kansas. However, this seed market will likely decrease if the interest in growing echinacea wanes. Dedicated echinacea growers will look for improved and guaranteed seed sources. Hybridization among species is common, thus it is hard to maintain seed purity. Echinacea seed already has documented germination problems. There appears to be greater demand for *E. angustifolia* but the price differential between *E. angustifolia* and *E. purpurea* will likely be insignificant in the future as the supply of seed grows.

The leaves and stems of echinacea can be harvested during the second and third years in a process similar to haying. The plant is cut and allowed to dry. The dried plant material can then be used for processing. However, the active medicinal portion of echinacea is not as potent in the

leaves and stems as what is obtained from the roots. Yields of 1,000 pounds of dried leaves and stems per acre are obtainable.

The roots are harvested in the fall in the third (sometimes fourth or even later) year after planting. Many growers harvest roots by hand digging them. Some growers report using subsoil knives to undercut the rows and beds, which raises the soil several inches and loosens the soil around the root. A large commercial grower uses a modified potato digger to harvest the roots. Small growers could use a moldboard plow or some type of modified vegetable root harvester. The harvested roots are then washed and dried at 120 degrees Fahrenheit to less than 10 percent moisture. Dried roots typically yield 1,000 pounds per acre.

Marketing

The driving force in the industry is that relatively few large businesses control manufacturing, distribution, and marketing of herbal products such as echinacea. Marketing echinacea involves many channels. Some growers do their own processing and market their own brands in health food stores. Other growers have a satisfactory outlet through an individual herb distributor. Many growers sell to small dealers or brokers who in turn, sell to larger dealers or pharmaceutical manufacturers that process the echinacea into capsules, extracts, or tinctures, that are then distributed into the retail market. Native echinacea is harvested and is currently marketed in this manner.

A long-term commitment is required to grow echinacea. Neither local dealers nor large dealers will likely enter into a contract with an inexperienced grower until they know what the grower can produce. A grower must raise a trial plot to supply the dealer with a product sample and build a reputation for quality and reliability. Large dealers and manufacturers often have minimum purchase amounts and will offer contracts to selected established growers. One grower suggested that

these items be addressed before marketing echinacea:

- **Botanical Identity Certificate** — Know what type of echinacea is being grown, as it might be one of the three recognized species or perhaps a hybrid.
- **Organic Certification** — For small growers, this is important. There is a market for non-organic product, but non-organic processors desire large quantities.
- **Laboratory Tests** — It is helpful to have the crop tested for active ingredient. One Kansas organic grower tested his crop in a German laboratory test and realized a higher percentage of active ingredient than that usually found. Further tests need to be conducted to see if this grower's production techniques are responsible for this result or if Kansas has a comparative advantage in raising echinacea with a stronger active drug component.

Production Cost Estimates and Cost Return Projections

Research information on the medicinal characteristics of echinacea is plentiful, but specific information about production costs and yields is virtually nonexistent. The production of echinacea is similar to raising a small acreage of vegetable crops. Most Kansas echinacea growers probably will have small acreages. If every grower were required to have the specialized machinery, equipment, and greenhouse needed to produce echinacea, the fixed costs would be prohibitive.

For those with less than 1 acre, the machinery and equipment needs could be replaced by hand labor. For growers with 1 to 10 acres, a producers organization or cooperative could be established to share equipment as well as knowledge about growing echinacea. In 1999, the price of echinacea fell to \$2.50 per pound from the nearly \$40 per pound reported in 1997. The short-run economic profits of the previous years appears to have produced an abundant supply of echinacea.

Market Demand

U.S. consumers spent more than \$12 billion on natural supplements in 1998, and sales are increasing by more than 10 percent yearly. Herbs are not only sold as capsules, tablets, extracts, and teas, but are included as healthy ingredients in conventional foods. Extensive consumer polling shows consumers are increasing their acceptance and understanding of botanical herbs. The natural foods market has the largest selection of hundreds of products including whole herbs, tinctures, extracts, and standardized products. Figure 1 shows the breakdown for all U.S. channels of consumer sales of herbs in 1997. After multiherb and others, echinacea had the largest market share at 9 percent.

The retail herb industry in the United States is fast approaching \$4 billion per year with the fastest growing segment of mass markets (supermarket, drug and mass merchandise) increasing by more than 100 percent annually. Figure 2 shows how the mass markets have rapidly grown since 1991.

Figure 3 shows the top selling herbs in the U.S. food, drug, and mass merchandise markets. Echinacea is the fifth highest selling herb after ginkgo, St. John's Wort, ginseng, and garlic. Echinacea is also marketed with goldenseal, and this combination also ranks as one of the top ten in sales.

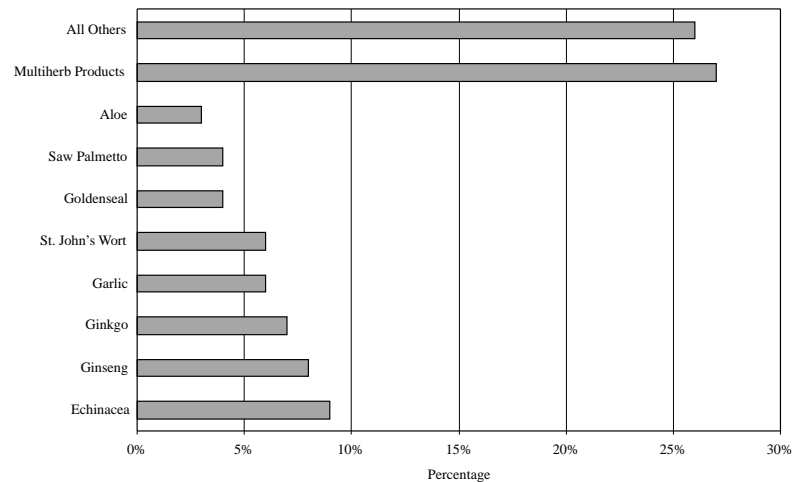


Figure 1. Percentage of Sales for Different Herbs in 1997 (Nutrition Business Journal)

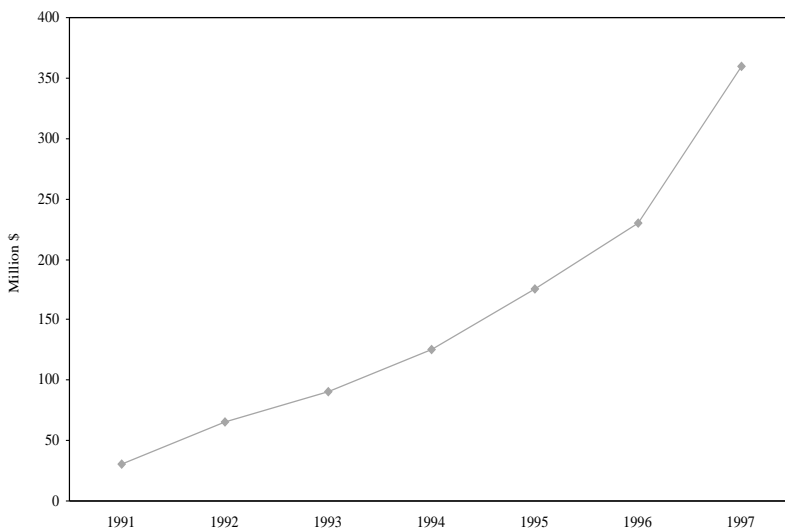


Figure 2. Growth in Food, Drug, and Mass Merchandise Markets for Herbs, 1991 to 1997 (HerbalGram)

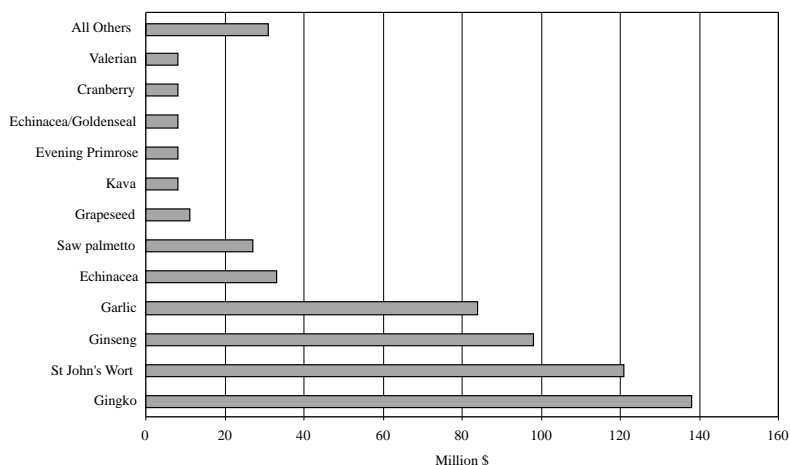


Figure 3. Top Selling Herbs in Food, Drug, and Mass Merchandise Markets, 1999 (International Research Institute)

Conclusions

The herbal industry is rapidly growing in the United States with potential for more expansion. Kansas has an ideal climate to grow many herbs. It is unclear whether Kansas growers have any advantages over other states in the Great Plains. Production and harvest techniques need to be established so growers will know how to raise herbal crops.

Like most niche markets, the price discovery process is relatively unknown. Thus, it is important that growers have a market for the crop before purchasing seed and entering this industry.

A coordinated effort to produce and market echinacea and other herbal botanicals, such as a producer organization or cooperative could provide, would be an invaluable tool to help future Kansas herb producers.

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