



PRODUCTION

Herbs

January 2010

The number of herbs that are available worldwide is exceedingly great, but only a limited number are grown commercially outdoors in Saskatchewan. Some herbs, such as sweet basil and rosemary, are adaptable to greenhouse production.

Interest in herb production in Saskatchewan, as well as all of North America, has grown dramatically in the last two decades. This has been stimulated by many consumers looking for natural food and organically produced products, ethnic foods, and alternative medicines, as well as farmers wanting to grow alternative crops for economic reasons.

There are three main categories of herbs that can be grown in this province:

- Culinary herbs
- Medicinal and cosmetic herbs
- Medicinal and essential oil herbs

Current Production

Statistics on herb production in Saskatchewan are not available. Many growers wish to keep their production information confidential and few surveys have been done.

Herbs grown in the past decade include:

1. Spearmint – for essential oil
2. Echinacea – medicinal
3. St. John's Wort – medicinal
4. Feverfew – medicinal
5. Garlic – culinary
6. Valerian – medicinal
7. Coriander – essential oil
8. Dill – essential oil
9. Sweet Basil – culinary
10. Chamomile – culinary/medicinal
11. Willowherb (fireweed) – cosmetic



St. John's Wort

A number of the above crops have not continued in popularity here, because of changing markets, increased competition worldwide, excessive labour requirements, poor adaptability, lack of grower or marketing expertise and in some cases, disease problems. Other herbs are being grown on a fairly small scale or experimental basis. These include:

Culinary: arugula, chives, cilantro, fennel, horseradish, lemon balm, oregano, parsley, peppermint, rosemary, sage, summer savory, sweet marjoram, tarragon, thyme. (Appendix 1)

Medicinal and cosmetic: astragalus, burdock, calendula, catnip, comfrey (for veterinary use only), dandelion, ginseng, goldenrod, goldenseal, hawthorn, lavender, licorice, marshmallow, milk thistle, motherwort, mugwort, mullein, red clover, sea buckthorn, seneca, ginseng, stinging nettle, wormwood, yarrow, yellow dock. (Appendix 2)

Essential or pressed oil: borage, caraway and dill have been produced in Saskatchewan. Some of the essential oils used in aromatherapy include angelica, chamomile, fennel, juniper, lemon balm, hyssop, marjoram, oregano, peppermint, sage, thyme and yarrow. Many essential oils are also from plants not suited to our climate.

Other Herb Crops

When venturing into new herb crops, it is essential to obtain as much information as possible about the crop before planting and then plant only on an experimental basis. Enough of the crop should be planted to simulate commercial production, 10 rows about nine to 10 metres long might be considered.



Caraway in the four to eight leaf stage.

Attention should be paid to:

- hardiness of perennial crops
- preferred soil type and growing temperatures
- length of growing season and moisture requirements
- propagation methods
- required equipment
- cultural practices required to ensure the plants do not become noxious weeds.

Above all, the ability to market the crop is paramount. Potential growers might also consider native plants as well as exotic ones. Health Canada's [Natural Health Products Directorate](#) is the regulating authority for natural health products for sale in Canada and has banned some herbs because of their toxic properties (e.g. ephedra).

Organic Production

Many herb growers choose to grow their crops organically as a marketing tool or as a personal choice. A good understanding of organic production and practices is needed to effectively address pest and weed control. If land has not previously been in organic production, there will be a time lag of several years before certification can be given. For more information, including a list of certifying agencies, check the Saskatchewan Organic Directorate website at www.saskorganic.com.

Labour Requirements

While some herb production, such as borage, milk thistle, chamomile and mint, can be produced on a field scale, the majority are produced in small plots as row crops or closely spaced in small beds. Harvesting for some crops may occur repeatedly over the season or at least once or twice a year.

The use of small machinery, such as water-wheel transplanters, plastic mulch-laying equipment, cultivators and in-field dryers should be considered. In some instances, there may be opportunities to cost-share with other growers in the area.

Irrigation is required for a number of herb crops for establishment and good yields. However, some are better as dryland crops. In addition, pest control, usually organic, may be necessary. Agronomic practices, such as between row-cultivation, can sometimes help reduce a pest population.

A good deal of hand-labour is required in keeping these plots free of weeds. The use of plastic mulches is gaining acceptance as a means of weed control, since it significantly reduces the amount of hand-labour required. It should be noted that few pesticides are registered in Canada for commercial herb production, although that is slowly changing.

Costs of Production



Echinacea

Cost of production information for herb crops on the prairies is not readily available. See the "Books and References" section of this document for a list of some materials.

Marketing of Herbs

The marketing of herbs is becoming increasingly competitive world-wide and prices can be very volatile. In the past few years, Saskatchewan growers have seen price drops in ginseng, echinacea and St. John's Wort. Most, or all, ginseng growers have ceased production in Saskatchewan because of the difficulty in competing in the global market. The number of echinacea growers has also sharply dropped.

should carefully investigate markets before deciding which crops to grow. Some promising new crops, particularly perennial ones, may not seem so promising in a few years if too many new growers enter the market at the same time. Since marketing of raw or dried product provides the lowest return, growers should also consider whether they should produce a value-added product, which involves processing or packaging. Growers do not necessarily have to produce their own value-added products, but may opt to contract to commercial firms who return the finished product for sale and distribution.

After determining which market segment is the most appropriate (medicinal, culinary, wildcrafted, oils) and the scale of production, potential growers should examine where the markets are located.

Culinary herb producers could check nearby restaurants to see if they use herbs and, if so, whether a market exists. It must also be determined if the producer can adequately supply quality product, in timely shipments. Farmers' markets, supermarkets and institutions are other outlets for fresh and dried culinary herbs; mail-order and websites should also be considered.

For medicinal plants, markets are limited in Saskatchewan and exporting is usually required. Existing companies may obtain exporting expertise and assistance through federal government programs. Many manufacturers and distributors are reluctant to change suppliers; however, smaller companies may be interested. Local herbalists or aromatherapists may also be interested in new suppliers, and health food stores are other possible outlets. Most growers market to manufacturers and may enlist the services of brokers.

Essential oils are marketed through international brokers. There are only a few Saskatchewan companies that are manufacturing herbal products, but some of them may provide contracts to new growers from time to time.

Growers should examine national and international markets. They should be prepared to devote considerable time to market their products. It is often stated that successful producers spend more time marketing than growing their crops. They should know who the rest of the players are in the herb industry and consider joining a producer association, such as the Saskatchewan Herb and Spice Association. Working alone may not always be desirable – working with a trader or a co-op to pool product may make markets more accessible.

Many large companies are interested only in large quantities of herbs. Samples are usually required so the company can determine the quality. Documentation from the supplier, as to the validity of species and quality analysis, may also be requested.

Growers should find out what quantity the company needs and then determine if it will be possible to fill that requirement, once full-scale production is underway. It may also be advisable to investigate the integrity of the company, as some have marketed samples from many growers without actually purchasing the product. Growers should beware of companies promoting and supplying plants at low cost with dubious promises to buy back the product in a few years time.

Herb Quality

The issue of herb quality is becoming increasingly important. Manufacturers are becoming more demanding in obtaining high quality raw materials. Guidelines such as good agricultural practices have outlined acceptable practices in raising crops.

On-farm quality assurance programs require growers to document their production so each lot can be traced back to its origin and method of production. While these programs are not yet mandatory, growers who do not conform to these programs may have greater difficulty in marketing their products in coming years.

The Natural Health Products Directorate under Health Canada has established regulations that regulate manufacturing and labeling of processed herb products. These regulations deal with health claims that can be made on the labels of products destined for consumers. This agency also prohibits the sale of herbal products that are considered dangerous. For more information, see "[Overview of the Natural Health Products Regulations Guidance Document](#)" on line at the Health Canada website at www.hc-sc.gc.ca.

It is very important that herb growers are certain of the botanical identification of their crop. A number of years ago, there was considerable mix-up in *Echinacea* species seed, so what was thought be *Echinacea angustifolia* turned out to be *E. pallida* or hybrids of the two. Buyers of seed may wish to insist on a certificate of authenticity before purchasing seed from a new source. This is of less concern where there is only one species normally marketed.

A number of medicinal herb buyers have specifications regarding desired levels of active ingredients or marker compounds for identity verification. The level of active ingredient can vary according to seed source or variety, cultural practices and weather conditions, as well as to post-harvest handling methods. Growers may wish to have their test plots analyzed before proceeding to larger scale operations in order to determine if minimal requirements can be met. There are laboratories in Canada that can offer this service.

Post-Harvest Handling of Herbs

Depending on the market, herbs are handled in various ways. Fresh-cut culinary herbs (and potted plants) are often sold at farmers' markets, directly to restaurants and stores or to wholesalers. The herbs are packaged according to the needs of the buyer, but may vary from five to 30 g poly bags, to one to three kg packages. Fresh herb producers need to be close to their markets in order to consistently supply good quality product. Short-term refrigeration may be required. The herbs must also be clean and free of insects.

Dried herbs have a less urgent need to be marketed quickly (feverfew is a notable exception) but are generally meant to be sold within three to 12 months, as quality of some may deteriorate after that time. Some particularly aromatic herbs (e.g. feverfew) may need separate drying and storage facilities to prevent the odour being absorbed by other herbs.



Astragalus root.

Growers need to determine the accepted methods of drying for each herb they grow. While some herbs may be dried outdoors in the field, greater quality control can be achieved by drying herbs indoors. In some instances, fans may be all that are required, while in other cases where rapid drying is desirable, dehumidifiers or artificial heat may also be used. The need for heat depends on the crop itself, relative humidity and temperature of the drying area. Exposure to sunlight while drying may be detrimental to the quality for some herbs. Special dryers are used by some growers, but grain bins and shaded greenhouses have been utilized. Where passive drying methods are used, the herb material is spread out on screened shelves to maximize exposure to air. It is important that the material dries quickly enough so that moulding or heating does not occur.

Washing is necessary to remove soil particles from root crops. If the roots are large, chopping or slicing may be desirable to allow for quicker drying, although it may be detrimental to the quality of some root crops. The drying and storage areas should be inaccessible to rodents, birds and pets.

Following drying to a moisture level of 10-12 per cent, the herbs are ready for shipping, storage or further processing. The latter may involve chipping of roots, cutting and sifting or grinding of the herb, depending on the ultimate market and the needs of the buyer. There are markets for bulk sales of unprocessed, dried and baled herb products, but small-scale growers may not

find these markets accessible or profitable.

Growers who wish to make their own value-added products might consider making skin-care products, teas, herb and spice mixtures, potpourris, ornamental products such as wreaths and swags, pictures, floral arrangements, as well as tinctures. Another market is the sale of herb seeds.

Medicinal and Essential Oil Herbs

Essential oils are commonly removed from plants by steam distillation or solvent extraction, but steam distillation is the most common method. Depending on the plant, petals, bark, seeds, stems or leaves may be used. The oils are marketed to the food industry as flavourings; to the cosmetic and perfume industry for perfumes; and to the pharmaceutical industry. There is also an increasing demand for essential oils by herbalists who practice aromatherapy.

Essential oils can be produced not only from herbs but also from trees such as spruce. Other potential herbs are angelica, fennel, monarda, basil, parsley, sage, thyme, tarragon, garlic, evening primrose, calendula, wormwood and yarrow. There is a large demand for rosemary oil, but it is not hardy here, so production would be limited as a field crop. Some studies have been conducted in Alberta to assess the feasibility of growing rosemary as an annual field crop.

Entering the essential oil market is not easy, as companies tend to remain loyal to suppliers that provide consistent supply and quality, and international competition is stiff. Quality analysis documents are valuable in finding markets. Aromatherapy markets may be more accessible to small-scale producers. Distillation equipment can be very expensive. Smaller, portable field distillation units have been developed that may be of value to growers wishing to enter this market. Prairie Agricultural Machinery Institute (PAMI) located at Humboldt, Saskatchewan, has done research on distillation equipment.

Starting a Herb Plot

Rather than choosing only one herb that is currently popular, growers should consider growing more than one crop (four to six), particularly if it is a perennial herb that will not be harvested for several years.

A field location should be chosen with a soil that is suitable for the crops to be grown. Root crops are best grown on light to medium textured soils to facilitate digging. Leaf crops may be more adapted to heavy soils. Access to irrigation may be desirable for some herbs, although some growers may use only portable tanks and passive drip systems. Crops like echinacea or Chinese milk vetch may need little or no watering.

The land chosen should be as weed-free as possible. Some herbs are slow growing and very poor weed competitors. Plastic mulches can be utilized to help control weeds, but organic growers should check with their certifying agency before purchasing plastic, as not all may be approved. The plastic may need to be removed in the fall of the first year in order to prevent excess moisture build-up.

Some herb crops are very susceptible to diseases that attack field crops such as canola. For this reason, growers may wish to avoid planting herbs in fields that were recently planted to canola or even adjacent to a current canola crop. The field and any irrigation water should also be free of herbicide and pesticide residues.

Where practical, direct-sowing of seed may be more economical, particularly if irrigation is used. A number of companies offer young herb plants, called plugs, which have been grown in greenhouses. Growers should carefully consider costs of using plugs, keeping in mind that market prices may drop between planting and harvesting. In addition, not all plugs will grow to a saleable size, particularly if the crop is susceptible to diseases such as aster yellows. If a greenhouse is available, growers may choose to start their own plugs. Care should be taken to ensure that the plugs are not excessively root bound before transplanting, especially for root crops. Transplanted herbs may require some irrigation to get them established, particularly if the weather is hot.

Transplanting can be done by hand or by mechanical transplanters, such as the water-wheel transplanter, which places and waters the plants in one operation.

Weed control is generally done by hand or with small cultivators, as there are few herbicides registered for herb production. Roguing is commonly practiced to remove diseased plants as they occur. For insect control, some organic growers use repellent sprays such as cayenne, but growers should always check with certification authorities to determine what, if anything is permissible.

Harvesting times vary according to the crop. It may occur before or during blooming season. When aerial parts are harvested, the grower must know at which stage to harvest. Some crops will re-grow and produce a second harvest

in the fall. Root crops are usually harvested in the fall after the first frost. Specialized equipment may be desirable to dig the crop, but it can be costly. Equipment may be available for rent from other growers.

Additional Sources of Information

Many herb growers obtained their expertise through trial and error, but networking with other growers is of great value. This can be done via the Internet or by joining an association.

The Saskatchewan Herb and Spice Association (SHSA) formed in 1991 achieved national prominence in promoting the herb and spice industry.

Saskatchewan Herb and Spice Association
P.O. Box 7568, Station Main
Saskatoon, Sk S7K 4L4
E-mail: shsa@sasktel.net
Website: www.saskherbspice.org/

This association holds one or more educational seminars each year, and has published the "Herb and Spice Production Manual" which can be purchased from SHSA.

The Saskatchewan Nutraceutical Network (SNN) formed in 1997 represents the nutraceutical, functional food and dermaceutical sector in the province. Its activities have been merged with:

AgWest Bio
101 – 111 Research Drive
Saskatoon, Saskatchewan S7N 3R2
Telephone: (306) 975-1939
Website: www.agwest.sk.ca/

Co-operative herb research between the University of Saskatchewan and irrigation researchers at Outlook, Saskatchewan has been ongoing for several years. Prospective growers may wish to visit the research site during the growing season at the:

Canada-Saskatchewan Irrigation Diversification Centre
Outlook, Saskatchewan
Telephone: (306) 867-5400

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Herb Research Publications in Saskatchewan

A number of herb research projects, funded by the Agriculture Development Fund, are ongoing or completed. Some of these are available at the Saskatchewan Ministry of Agriculture's web site at www.agriculture.gov.sk.ca | Research

Additional research projects have been funded by the Agri-Food Innovation Fund.

Internet Sites

In addition to those previously mentioned, there are many other university, provincial and state web sites, as well as those of herb associations and health organizations and private companies. Doing an Internet search for medicinal herbs, natural health products or specific crop names will yield many results.

Written and edited by:

Crops Branch, Saskatchewan Agriculture

Appendix 1 - Some Common Culinary Herbs

Name	Propagation	Culture	Use	Growth Habit	Harvest
Anise <i>Pimpinella anisum</i>	Seed; use fresh seed.	Likes sun, space 15-20 cm apart.	Green leaves and seeds in salads, meats, bakery goods: tastes somewhat like licorice.	Annual, slow growing, flowers in flat clusters; finely-cut lobed leaves.	Use leaves fresh; harvest seeds when ripe, remove from stems and store.
Borage <i>Borago officinalis</i>	Seed; sow direct in spring.	Likes dry, sunny site; will self-sow.	Leaves have mild cucumber flavor; used in salads, pickles, in eggs, and with fresh flower sprays in fruit drinks. Flowers also are edible.	Annual, bushy plant, growing to one metre in height; blue flowers are ornamental.	Pick blossoms as they open; leaves are used fresh. Seeds are a source of gamma linolenic acid.
Caraway <i>Carum carvi</i>	Seed; sow in spring or fall.	Full sun; light soil; seeds produced second year. Prone to blossom blight.	Seeds used to flavor bread, pastry, meat, soups, sauces, confections, cheese.	Biennial, but annual strains exist. Feathery foliage; creamy flowers resemble carrot.	Dry seed heads; harvest seeds in autumn (second year if biennial).
Catnip <i>Nepeta cataria</i>	Seed; sow shallowly; root division, cuttings.	Easy, not fussy as to soil, best in full sun. More aromatic in sandy soil.	Not really culinary, used in toys for cats or medicinally as tea. Lemon catnip is of more culinary value.	Perennial, height 30-160 cm. Erect, large-toothed leaves and small whitish or pinkish flower spikes, attracts bees.	Fresh or dried leaves; or flowering tops, from midsummer onwards.
Chamomile, German <i>Matricaria recutita</i>	See Appendix 2.				
Chervil <i>Anthriscus cerefolium</i>	Seed; sow in fall and spring for succession of greens.	Partial shade; rich organic soil, moist.	Leaves usually used fresh in salads, soups, omelets or as garnish.	Annual. Leaves are parsley-like, ferny. Goes to seed quickly.	Leaves are harvested and best used fresh; can be frozen for later use.
Chives <i>Allium schoenoprasum</i>	Seed or division of clumps.	Rich, moist soil, full sun, culture similar to onions.	Leaves mainly used fresh or freeze-dried, in salads and seasonings.	Perennial, from bulbs. Long narrow leaves, edible flowers.	Leaves and/or flowers used fresh or dried.
Cilantro/Coriander <i>Coriandrum sativum</i>	Seed; sometimes transplanted.	Full sun, light soil, needs lots of space.	Leaves in salads, meat dishes; seeds for spices in baking, dressings.	Annual; upright, pinkish-white flowers, aromatic foliage.	Cilantro leaves are picked fresh before flowering; coriander seed harvested in fall before shattering.
Cress <i>Lepidium sativum</i>	Seed; sow shallowly and repeatedly.	Easy, likes moist, rich soil and cool weather.	Leaves used fresh in salads, soups, sandwiches, eggs or as sprouts or garnish.	Annual, fast growing to 30 cm, with dissected or curly foliage; flowers are small, white.	Leaves or entire top harvested before bloom. Becomes very peppery in hot weather.
Dill <i>Anethum graveolens</i>	Seed; repeat sowings for summer-long supply. Select leaf varieties if seed production is not desired.	Sow early; needs rich soil and plenty of space, full sun.	Leaves used for salads; fresh leaves and seed heads for pickles; after drying use to season meats, fish, vegetables, pizza.	Annual, to one m in height; feathery foliage; rampant grower.	Leaves best just as flowers open; harvest seeds as soon as ripe, cut off whole plant and hang to dry.

Fennel <i>Foeniculum vulgare</i>	Seed; directly in soil.	Sow early; likes hot, sandy, rich soil, needs lots of space.	All parts of leaves, stems and seeds aromatic; used for fish seasonings and sauces.	Annual, resembles dill.	Flower stalks harvested just before bloom; leaves best used fresh; seeds dried as for dill.
Fenugreek <i>Trigonella foenum-graecum</i>	Seed.	Requires well-drained, medium textured loam of moderate fertility, full sun and warm weather.	Seeds used as a spice, such as in curries, pickles, stews and soups or as artificial maple flavoring.	Annual with pea-like foliage, 30-60 cm; flowers pale yellow or white, pods long and narrow with 10-20 oblong seeds.	Seed harvested in fall when mature.
Garlic <i>Allium sativum</i>	Sets; planted as onions.	Well-drained soil, full sun, keep moist. Plant in fall and mulch, or mid April.	Chopped cloves for seasoning meats, vegetables, soups, salads; garlic salt from pulverized cloves.	Perennial but harvested annually; hardneck types produce flower heads; flat, onion-like leaves; bulbs consist of cloves.	Dig bulbs in late summer, dry well.
Giant Hyssop <i>Agastache foeniculum</i>	Seed, best started indoors; also divisions and cuttings.	Adaptable to many soils but dislikes wet locations; full sun.	Leaves used in teas, to flavor peas, lamb, fruit salads; flowers also used.	Perennial or annual to 1.5 m; stiffly erect with large toothed leaves; blue flower spikes attract bees.	Harvest anytime during growing season. Leaves and flowers may be used fresh or dried.
Good King Henry <i>Chenopodium bonus-henricus</i>	Seed or transplants.	Easy, will grow almost anywhere but does best on rich, moist soil.	Young shoots eaten like asparagus and leaves used as spinach.	Perennial to about 75 cm; large arrow-shaped leaves; flowers small, greenish.	Young shoots may be blanched before cutting. They may need peeling. Fresh young leaves picked just before use.
Horseradish <i>Armoracia rusticana</i>	Root division in fall or root cuttings in spring.	Deep sandy loam, moist soil is best but will grow in most soils. Full sun or light shade.	Young roots ground and used in sauces or relishes. Rarely, blanched leaves are used in salads.	Long-lived perennial best grown as annual or biennial; erect plant with long-stalked, oblong leaves and a long taproot.	Dig roots in late fall and store at 0° C. Cleaning and grating of roots should be done outdoors; once grated, vinegar and/or cream should be added.
Lavender <i>Lavandula angustifolia</i>	Seed or cuttings.	Sun and poor soil for most fragrance; avoid wet sites; may need winter protection.	Rarely culinary; mostly for ornament or sachets; flowers used fresh or dried.	Perennial; somewhat woody, gray-green leaves and blue or purple flower spikes.	Cut and dry whole flower spikes when flowers begin to open; do not use excessive or prolonged heat when drying.

Lemon Balm <i>Melissa officinalis</i>	Seed (very slow); root divisions or cuttings.	Moist, well-drained soil, but tolerates light, dry soil. Full sun or partial shade.	Leaves used in salads, sandwiches, soups, stews, meats, egg dishes, vegetable dishes, vinegars, desserts and beverages; also medicinal uses.	Somewhat tender perennial, often winterkilling in Saskatchewan. Plants low, bushy, with oval, toothed leaves. Small, tubular white flowers on overwintered plants.	Harvest early in season or cut back plants to promote fresh growth which has best flavor. Cut entire tops and dry by hanging in shade.
Lemon Verbena <i>Lippia citriodora</i>	Cuttings.	Tender shrub, full sun outdoors, winter indoors.	Leaves for fragrance and to give lemony taste to beverages.	Narrow, shiny leaves, lemon scented; not hardy on the prairies.	Strip leaves individually from plant; dry on screens.
Lovage <i>Levisticum officinale</i>	Seed (slow) or transplants; root division. Fresh seed is important.	Deep, fertile, moist, well-drained soil. Full sun or light shade. Very hardy.	Leaves used as celery substitute in soups, salads, casseroles, stir-fries. Seeds sometimes used.	Very large perennial to two m or more, resembling celery. Small yellow-green flowers in heads like dill.	Leaves harvested at any time, used fresh or dried. Seed stalks can be cut when turning brown and dried.
Mint <i>Mentha spicata</i> <i>Mentha x piperita</i> <i>Mentha x gracilis</i>	Stolons; seed strains are of inferior quality.	Full sun or semi-shade, rich moist soil. Variable hardiness.	Teas, mint sauce, candy.	Perennial, but peppermint requires winter protection; purple flowers, spreads rapidly by stolons; menthol odor.	Pick leaves individually; use fresh or dried; pick just as flowering begins.
Oregano <i>Origanum vulgare</i>	Seed or division.	Grows well in poor soil, full sun.	Fresh or dried leaves as meat or vegetable seasoning; used in pizza.	Perennial, although superior types such as greek oregano rarely winter on the prairies. Soft, rounded leaves, in clumps up to 2 feet high.	Cut stalks when plant starts to flower; hang to dry 2 weeks; remove leaves, crumble and store.
Parsley <i>Petroselinum crispum</i>	Seed; sow early inside.	Medium rich soil; sun or part shade.	Seasoning for soups, meats, salads; garnishes.	Biennial but grown as an annual on the prairies. Plain leaf Italian parsley is taller and considered more flavorful; curly leaf parsley is short and compact.	Harvest anytime when plants are of sufficient size; use fresh or freeze; drying is the least preferred method of preservation.
Rosemary <i>Rosmarinus officinalis</i>	Slow from seed; stem cuttings.	Grow in greenhouse or outdoors in summer only; full sun; good drainage required.	Seasoning for foods, especially poultry.	Tender shrub grown in pots or greenhouse beds; upright to trailing, evergreen with narrow leaves and blue or pink flowers in season.	Cut branches when of sufficient size; dry slowly; avoid excessive heat; freezing not recommended.

Sage <i>Salvia officinalis</i>	Seed, stem cuttings or crown divisions.	Full sun, well-drained soil.	Seasoning for meat or in poultry stuffing.	Grey, shrubby perennial; semi-hardy on the prairies; woody, sprawling habit, blue flowers, leaves woolly.	Cut leaves or leafy tops when flowers begin; dry. Avoid late fall harvest to lessen chance of winter injury.
Summer Savory <i>Satureja hortensis</i>	Seed.	Full sun, medium rich soil.	Seasoning for soups, sauces, egg or bean dishes.	Annual, with upright but sprawling habit, small mauve flowers and pungent leaves.	Cut stalks when starting to flower or cut tops when in bud; hang to dry. Freezing not recommended.
Sweet Basil <i>Ocimum basilicum</i>	Seed. Genovese is considered one of the best.	Grow in greenhouse year round or transplant outdoors in June; resents cold weather, needs sun.	Seasoning for soups, salads, vegetables and meats.	Annual, bushy plants with green or purple leaves and white or purple flowers late in season. Many varieties exist, differing in flavor, size, colour.	Cut stalks or individual leaves as plants become large enough; best before flowering. Dry for two weeks.
Sweet Marjoram <i>Origanum majorana</i>	Seed, or cuttings.	Start indoors and transplant out in spring. Full sun.	Leaves used for seasoning meat dishes.	Tender perennial, grown as an annual, low bushy habit to 30 cm; grayish-green leaves and tiny white flowers.	Cut stalks when starting to flower; hang in dark area to dry.
Tarragon (French) <i>Artemisia dracunculoides</i>	Division of roots. French tarragon cannot be grown from seed.	Plant outdoors in well drained soil in full sun; requires a winter period to maintain vigour.	Leaves used in sauces, sea foods to impart a slight licorice flavor.	Perennial, to one m, upright but may be sprawling.	Young leaves and stem tips are harvested and used fresh (preferably) or dried.
Thyme <i>Thymus vulgaris</i>	Seed or cuttings, or by division.	Slow growing, start indoors early and transplant out in spring; light soil and full sun best. Winter mulch.	Leaves and stem tips used as seasoning in soups, sauces, vegetable and meat dishes.	Semi-tender perennial with shrubby habit, growing to 20 cm.	Harvest tops anytime during summer; hang to dry.

Appendix 2 - Some Medicinal Herbs and Their Uses

Name	Propagation	Culture	Use	Growth Habit	Harvest
Burdock – <i>Arctium lappa</i>	Seed, sow 1.3 cm deep, thin to 15 cm.	Full sun, moist, average to high organic soil; heavy soils should be avoided.	Mild laxative, diuretic, antirheumatic, antibiotic, promotes sweating, skin problems, arthritis.	Naturally a perennial, but grown as an annual crop; taprooted, very large plant with hairy leaves.	Harvest roots at end of first growing season. Difficult to dig. Leaves sometimes dried. Seeds can be harvested in second year.
Chamomile, German – <i>Matricaria recutita</i>	Seed, direct sow or transplant, irrigate to germinate.	Rich soil not required, should be well-drained; full sun; some irrigation desirable.	Teas used for appetite, indigestion, insomnia; ointments for bites, wounds, eczema, mouthwash.	Annual plant, 30 – 60 cm tall; branches readily; finely divided leaves and white daisy-like flowers.	Flower heads are harvested as they open. Hand harvesting may not be economical; mechanical harvesters are still being adapted.
Echinacea/ Purple Coneflower – <i>Echinacea angustifolia</i>	Seed (should be certified as to identity and purity), direct sow after stratification or transplant.	Light, well-drained soil important; full sun. Very poor weed competitor in first year. Minimal irrigation.	Immune stimulant; infections, inflammation, colds, flu, kidney and urinary tract infections, sore throat.	Perennial, 30-45 cm tall, upright plants with narrow, hairy leaves; pale lavender flowers with orange-brown centres.	Roots dug in September of third year. Seed can be harvested in second and third years. Prices are dropping.
Feverfew – <i>Tanacetum parthenium</i>	Seed, direct sow shallowly or transplant.	Tolerates most soils; full sun preferred; drip irrigation may increase yields; overhead irrigation may reduce medicinal potency.	Migraine headaches, arthritis, menstrual pain.	Perennial, but may not overwinter in Saskatchewan; grow as annual. Bushy, chrysanthemum-like growth, 30-45 cm tall, white, daisy-like flowers.	Traditionally only leaves harvested, but some companies desire flowering tops. Short shelf-life; must be isolated from other herbs.
Ginseng – <i>Panax quinquefolius</i>	Seed, sown in fall or stratified and sown in spring.	Needs shaded conditions from artificial shade cloth or grown in wooded areas; raised beds desirable, highly organic soil; good moisture and high humidity; may need fungicides for disease control; summer and winter mulching essential.	Tonic, stimulant, regulates blood sugar and cholesterol, simulates immune system, used for diarrhea, asthma, coughs.	Slow growing perennial, 30 - 60 cm tall, with large broad leaflets. Small greenish-white flowers form red berries in fall. White roots are taprooted and take several years to develop size.	Usually harvested in the fall of the fourth or fifth year; larger roots giving better prices. Proper drying necessary to retain quality. Seed may also be marketed. Prices have dropped considerably. Not currently recommended here.
Goldenseal – <i>Hydrastis canadensis</i>	Seed, but must be kept moist from harvest until planted; young divisions or root buds often used.	Requirements similar to ginseng; may tolerate slightly more sun; less disease-prone but requires good drainage and winter protection. Questionable adaptability here.	Tonic, digestive stimulant, for skin inflammation, eczema, mucous conditions, yeast infections, menstrual pain, mouth and gum problems.	Slow growing perennial, to 45 cm; light green, palmate and toothed leaves, insignificant flowers followed by red berries; rhizomes are yellow.	Rhizomes are harvested in fall or early spring; usually in year four if from root divisions, but one or two years later from seed planted crops.

Milk Thistle – <i>Silybum marianum</i>	Seed, sown in fall or spring.	Will grow on any well-drained soil; full sun; long season required to ripen seeds. Improved selections available from SHSA.	Liver and gallbladder diseases, jaundice, cirrhosis, hepatitis, poisoning by alcohol, drugs, chemicals and Amanita mushrooms.	Grown as an annual; large plants 1.2-1.8 m tall, upright, with large stiff, very spiny leaves which are dark green marked with white. Thistle like purple flowers produce black seeds attached to white hairs.	Seeds are harvested, but timing is difficult as not all mature at once. Flower heads are cut and allowed to dry, then cleaned to remove seeds. Pre-desiccation of plants is desired to reduce biomass.
Milk Vetch, Chinese – <i>Astragalus membranaceus</i>	Seed sown in spring or fall; often transplanted.	Well-drained soil essential to prevent root rot. Prefers dry, sandy soil and full sun. High fertility not required.	Used in traditional Chinese medicine as an energy tonic, to increase immunity, to treat incontinence.	Perennial legume with grooved stems and pinnate leaves, growing to 40 cm and similar width. Yellow, pea-like flowers and rhizomatous roots.	Rhizomatous roots are harvested in fall of third year or later. Roots are cut up to facilitate drying.
Nettle, Stinging – <i>Urtica dioica</i>	Seed or root divisions.	Moist, fertile soil, high in organic matter is best. Sun or light shade. Irrigation may be desirable.	Internal use to treat anemia, hemorrhage, arthritis, skin problems; externally for burns, bites, arthritis, gout, sciatica. More recent use of roots for prostate problems.	Tall bushy perennial plant up to two m. Dark green, toothed leaves with stinging hairs (except when very young); greenish tassel-like flowers in summer; creeping roots.	Cut entire plant to near ground before flowering starts. More than one harvest per year possible on established plantings. Foliage loses stinging properties once dried. Roots may also be harvested.
St. John's Wort – <i>Hypericum perforatum</i>	Seed direct or transplant from seed plugs.	Adapted to dry, porous soils, but may grow better in moister, richer soils. Full sun. Some irrigation may be beneficial. Noxious weed in some areas. Snowcover necessary.	Internal use for treatment of depression, anxiety, shingles, sciatica, menopausal problems; externally for burns, bruises, injuries, pain.	Bushy, small-leaved plant 60-90 cm in height, perennial. Flowers are prolific, showy, yellow with 5 petals, in midsummer. Rhizomatous roots will spread.	Flowering tops are harvested at early to prime bloom. In some areas more than one harvest per year may be possible. Spoils easily if not dried properly.
Skullcap – <i>Scutellaria lateriflora</i> ; <i>Scutellaria baicalensis</i> , <i>Scutellaria barbata</i> .	Seeds or root divisions; occasionally by cuttings.	Good fertile soil; often grown in shade, but sun tolerant if moisture is adequate. Likes ample moisture and may need some fertilizer; hard to weed. <i>S. baicalensis</i> needs good drainage and requires less moisture.	<i>S. lateriflora</i> for insomnia, irritability, neuralgia, nervousness; <i>S. baicalensis</i> for fever, lowering blood pressure and cholesterol, improving digestion, dysentery, diarrhea, hemorrhages.	Perennial; <i>S. lateriflora</i> grows to 75 cm and is rhizomatous, spreading widely. <i>S. baicalensis</i> is shorter to 40 cm. Leaves are ovate-lanceolate, flowers are blue or purple and tubular, in racemes.	Entire above-ground plant can be harvested; multiple harvests per year may be possible. Needs quick drying to prevent overheating.

Valerian – <i>Valeriana officinalis</i>	Seed or root division; often transplanted.	Well-drained, rich moist soil; irrigation common. Supplementary fertilizer may be desirable. Full sun or light shade. Very prone to aster yellows disease and accompanying root-rots.	Treatment of insomnia, anxiety, cramps, migraine, ulcers, minor injuries.	Perennial, tall vigorous plant to 1.5 – 2 m; large pinnate leaves; showy, scented white flowers in summer; roots are short rhizomes.	Only roots are harvested, usually in autumn of second year. Difficult to clean; roots have unpleasant odor but which attracts cats.
Willowherb/ Fireweed – <i>Epilobium angustifolium</i>	Seed; direct or transplanted plugs.	Little cultural information available; often harvested from wild stands. Adaptable to dry soil, may not require high nutrient levels.	Cosmetic uses; treatment of sunburn.	Tall, perennial plants to 2 m, narrow, with somewhat willow-like leaves and very show pink, light purple or white flowers in racemes. Roots are rhizomatous. Often considered invasive.	Harvest top growth in summer during early to full bloom by hand picking in wild or swathing cultivated crop. Dry in field for 2 days then use dryers (large capacity required). Markets limited at present.
Yarrow – <i>Achillea millefolium</i>	Seed; direct sow or transplant.	Well-drained soil; high fertility not required. Drought tolerant but occasional irrigation may improve yield.	Treatment of colds, flu, measles, diarrhea, rheumatism, arthritis, menstrual problems, hypertension, wounds, nosebleeds, ulcers.	Perennial, 60-90 cm, strongly rhizomatous. Foliage is soft and fern-like, flowers are small, in umbels; usually white, but red and pink forms exist.	Flowers, leaves or entire top growth may be harvested in summer. Limited markets.