



BEEKEEPING IN ECOTOPIA by Michael Pilarski

Lark D'Arbole was born in 1948. During 1982 he was transported into the year 2100. After several days in the future he reappeared back in 1982. Other time-trips have occurred at irregular intervals since that first trip. As a result of D'Arbole's visits he has been able to give us an idea of life in the Pacific Northwest 118 years into the future. On one of his visits in 1983 Lark brought back the following report.

"I have been working with beekeepers since the mid-1970's and on my first trips to the future noticed the common presence of beehives throughout every area of habitation. On my last visit Mariah, my usual guide, and I decided to investigate beekeeping in the 22nd century.

Our first stop was at the Puyallup Beekeeping Institute (PBI), one of the principal centers for apary research in the Puget Sound region. PBI particularly specializes in honeybee/plant relationships. A very pleasant day was spent in the center's apiaries, gardens and offices and the following picture emerged.

It appears that a renaissance in small-scale beekeeping took place as part of the great "Green Thumb" movement which swept the U.S. and Canada in the 1990's. A period during which almost every adult and child took up gardening.

In 2101 there were over 2,000,000 beekeepers in the U.S. alone. The previous peak in beekeeper numbers in the U.S. was in 1915 when there were 600,000 beekeepers. The low was in the late 1970's. In 1978 there were 3,000 commercial beekeepers in the Pacific Northwest states of Washington, Oregon, Idaho and Montana, plus a small number of hobby beekeepers. In 1978 the average number of hives per beekeeper was 106. In 2101 there were 160,000 beekeepers in the same 4 states with an average of 8 hives per beekeeper. Although there are large-scale beekeeping operations most of the honey production is from small beekeepers who keep a small number of hives to meet family honey consumption and sell locally. The U.S. per capita consumption of honey in the 1960's was 1.5 lbs/yr. White sugar consumption was 130 lbs/yr per capita in 1983. In 2100 honey and sugar consumption were both around 20 lbs per capita. Honey production had increased 8 times during the 118 years and the PNW was an exporter of honey although the majority was consumed locally.

Clearcutting was little practiced in 2100 as the demand for wood was so much lessened and selective cutting was more common. Many of the pioneer plants which colonize disturbed forestland in the PNW are good honey-plants; notably fireweed, huckleberry, maples, raspberry, salmonberry, blackberry, willows, and alders. The decline in clearcutting caused a drastic reduction of prime bee pasture. Forestry practices in 2100 took this into account and clearcuts, strip cuts and selective cuts were often seeded with honey-plants. Since clearcutting declined so much, beekeepers were occasionally accused of starting forest fires to create more mountain bee pastures. There was also a controversy between beekeepers seeding non-native honeyplants in forest-fire burns and wilderness proponents who wanted no more human intervention. PBI managed forest land in its mountain fields stations to delay the natural succession to conifers. PBI also worked with huckleberry cooperatives who maintained the productivity of their huckleberry patches by periodic burning. The huckleberry fields provided the honeybee colonies with large crops of honey, the huckleberry fields were assured of good pollination and the workers protected the beeyards from bears.

My tour of the gardens of the Puyallup Beekeeping Institute provided one of my most noteworthy journeys into the future. PBI was founded in 2010. The Institute's grounds cover 800 acres of valley and hillside. Plus field stations in the Cascade mountains. The Institute manages several thousand hives plus provides bee pasture to outside hives during peak honeyflows. After 91 years of plantings the bee gardens are botanical and aesthetic marvels. Thousands of plant species and varieties are under trial. The grounds are a riot of color and fragrance. The Institute's personnel were proud of the continuous color display. They explained that both nectar and pollen had to be available to the bees from earliest spring until winter's cold, wet season kept the bees indoors. Nectar is the bees carbohydrate food and pollen is their protein source as well as provides most of their minerals, vitamins, enzymes and more subtle plant essences. Pollen is needed throughout the year, but is particularly important during spring brood rearing to build up hive numbers.

The most important period for making honey is during the sunny periods of summer after the hives have built up strength. Many

One of the major themes of the Institute was multiple-purpose plants which supplied other useful products besides nectar/pollen. This is perhaps best exemplified by their extensive plantings of medicinal herbs. A neighboring school which teaches the cultivation and uses of medicinal herbs helps tend the herb gardens and harvests large quantities of herbs. Harvesting is staggered to prolong honey flow. Many species of herbs if cut during early bloom will send up new shoots and consequently offer bee forage after the uncut herb plants have finished blooming. Thus hyssop, lavender and sages are kept blooming from early summer till late fall. The sale of herbs and herb products supports hundreds of local families. The institute also collects seed from its plantings to bring in income, plus dye-plant products, cut flowers, dried flowers and a host of other products.

Dairy cows and other livestock are also integrated into the Institutes production. Pastures and green forage crops are composed of many legumes and other honey plants which have few thorns. Cuttings are staggered to yield bee forage as well as animal forage.

Honey and other hive products are large contributors to PBI's income. Beeswax, royal jelly, propolis and bee venom are all marketed. Many hives are managed primarily for royal jelly production and hive yields have been raised to two pounds per year of this precious substance.

The network of apary hedges being tested divides the landscape into many private nooks and enclosed gardens. Apiary hedges protect the hive from cold or drying winds. Most of the hedges are composed of several shrub species, sometimes intertwined with vines. Conifers or broadleaved evergreens were usually mixed with deciduous species, so that year-round protection is obtained. Honeybees like the hedges because to their hives to be only 5-7 feet tall, otherwise it slows them down entering and leaving the beeyard. Some hedge species normally stop growth at this desired height, others must be maintained with pruning. Many of the hedgerow species provide bee food such as holly, caragana, spiraea, buffaloberry, Eleagnus, heather, buckthorn, strawberry tree (Arbutus unedo), Viburnum, Perovskia, brooms, Buddleia and others. Many fruit trees and berry plantings are scattered throughout the beehscape as most are excellent nectar/pollen sources. Also many vegetables are bee plants. As a result the Institute produces most of the food needed by its personnel, plus exports considerable amounts. Even the shade trees, windbreaks and woodlots are honey-plants. Wide use was made of the lindens, black locust, maples, sourwood (Oxydendron arboresum) willows and the Royal Paulownia with its large pyramids of fragrant, lavender blossoms. The woodlots are mainly hardwoods managed for veneer, coppice, timber and firewood. Woodland herbs such as ginseng, goldenseal, bloodroot (Sanguinaria canadensis) and false solomon's seal are often planted underneath. Corridors and clearings were cut in the woods to increase edge effect and offer niches for shrubs and herbs which yielded bee forage. Honeybees do not like their hive sites situated in clearings of less than one acre.

Even the weedy, unused corners of land were utilized for bee forage. Weeds such as catnip, dandelion, mustard, chickweed, vipers bugloss and asters were encouraged. Instead of grass sod in the orchards, there were rotations of honey plants to build soil fertility or perennial herb groundcovers including such honeyplants as dandelions, asparagus, milkweed and clover.

Honeyplants were everywhere! The marshes and edges of waterways in the river floodplain had honeyplants such as cattails, marshmallow, butterfly weed (Asclepias tuberosa), purple loosestrife, arrowhead, smartweed, teal and others of economic

CHECKLIST OF HONEY PLANTS

Following is a list of plants which supply nectar and/or pollen to honeybees. The list is selected with temperate North America in mind, but includes non-native plants as well as native. It includes most major honey-plants, but could be considerably lengthened. Additions to this list can be sent to Michael Pilarski, PO Box 1064, Tonasket, WA 98855. This list is not standardized or alphabetized, however this will be corrected in future checklists. The major honeyplants of each category tend to be listed first.

- TREES**
Maples; Willows; Black Locust (Robinia pseudoacacia); other Robinia; Tupelos (Nyssa); Tuliptree (Liriodendron tulipifera); Prunus; Basswood or Linden (Tilia); Sourwood (Oxydendron); Honeylocust (Gleditsia); Apple; Pear; Apricot; Cherry; Peach; Almond; Quince; Flowering Quince; Hawthorn; Medlar; Catalpa; cottonwood; Madrone (Arbutus menziesii); Loquat; Sassafras; Halesia; Yellowwood (Cladastris lutea); Eucalyptus; Orange; Oak; Elm; Alder; Goldenrain Tree (Koreuteria paniculata); Holly (Ilex); Persimmon (Tamarisk); Hackberry (Celtis); Redbud (Cercis); Russian Olive; Paulownia; Pagoda Tree (Sophora); Hop Tree (Ptelea trifoliata); Walnut; Hickory; Ash; Beech; Birch; Chestnut; Aspen; Pine; Tree-of-heaven (Ailanthus altissima);
- BERRIES**
RASPBERRY; Blackberry; other Rubus; Currants; Gooseberries; other Ribes; Huckleberry; Blueberry; other Vaccinium and Gaylussacia; American Highbush (Viburnum trilobum); Buffaloberry (Shepherdia); Oregon Grape (Mahonia); Berberis; Strawberry; Salal (Gaultheria shallon); Elderberry (Sambucus); Serviceberry (Amelanchier); Strawberry Tree (Arbutus unedo);
- SHRUBS**
SNOWBERRY (Symphoricarpos); Prunus; Eleagnus; Heather (Erica); Eriogonum; Galbanum (Ilex glabra); Cassara (Rhamnus purshiana); Buckhorn; other Rhamnus; Manzanita (Arctostaphylos); Caragana; Ceanothus; Mountain Mahogany (Cercocarpus); Cotoneaster; Dogwood (Cornus); Salvia; Honeysuckle (Lonicera); Sagebrush (Artemesia); Privet (Ligustrum); Rose (Rosa); Sumac (Rhus); Clethra; Buddleia; Pyracantha; Sorbus; Frangula; Calycanthus; Aralia; Cephalanthus; Mock-orange (Philadelphus); Brodiaea (Cystisus); Osmantha; Viburnum; Spiraea; Escallonia; Mexican-orange (Choisya ternata); Callicarpa; Daphne; Perovskia; Baccharis;
- VINES**
Honeysuckle (Lonicera); Hops; Wisteria; Grapes; Ivy (Hedera helix); Bittersweet (Celastrus); Clematis; Wild Cucumber (Echinocystis labata); Parthenocissus;
- HERBS**
Sage (Salvia); Anise-hyssop (Agastache); Hyssop (Hyssopus); Lavender; Motherwort (Leonorus); Mint (Mentha); Borage; Beebalm (Monarda); Monardella; Horehound; Fennel; Wormwood; Comfrey; Purple Loosestrife (Lythrum); Mountain Mint (Pycnanthemum pilosum); Savory (Satureia); Boneseet (Eupatorium); Lemon Balm (Melissa); Yerba santa (Eriodictyon californicum); Arnica; Germander (Teucrium); Basil; Bloodroot (Sanguinaria canadense); Coltsfoot; Dracocephalum moldavica; Eyebright (Euphrasia officinalis); Meadow Saffron (Colchicum autumnale); Stachys; Wood (Isatis tinctoria); Licorice (Glycyrrhiza); Vervain (Verbena);
- LEGUMES**
Sweet Clover; White Clover; Alfalfa; Alsike Clover; Crimson Clover; Bur clover (Medicago hispida); Forest Clover (Trifolium dreweri); Vetch (Vicia); Birds Foot Trefoil (Lotus corniculatus); Ladino Clover; Bellini Clover (Trifolium ambiguum); Red Top Clover (Trifolium pratense); Hop Clover (T. campestris); Wagner Pea (Lathyrus sylvestris wagneri); Sainfoin; Serradella (Ornithopus sativa);
- WILDFLOWERS**
Fireweed (Epilobium); Asters; Goldenrod; Phacelia; Milkweed (Asclepias); Bugleweed

130 lbs./yr per capita in 1983. In 2100 honey and sugar consumption were both around 20 lbs per capita. Honey production had increased 8 times during the 118 years and the PNW was an exporter of honey although the majority was consumed locally.

Although honey production still varies from year to year depending on weather, average hive yields are much higher. This is attributed to the greater attention to detail and timing the small beekeeper can give to each hive. Another factor has been the large increase of honey-plants. Much of this was unplanned and happened as a result of the great plantings of vegetable gardens, backyard orchards and city beautification programs during and since the green thumb movement.

As beekeeping became more widespread many small beekeepers began planting herb patches, flower beds, hedgerows and trees which could supply their hives with nectar and pollen. Knowing what plants would thrive and produce abundant bee food under each site's particular conditions gave rise to the science/art of **Beescaping**.

Beekeepers vye with each other for the most beautiful and productive bee gardens and beescapes. 100 hives to the acre has proved hard to maintain on a consistent basis, even in the best climates so it has become a well-earned honor to become a member of the "100 Club". Surpluses of 100 lbs/hive are common. The record hive yield is over 600 lbs. (The record in 1983 was already over 400 lbs.)

In the 1980's during the height of industrial age beekeeping, most bee colonies were moved at least once a year, often 2, 3 or even more times. Moves of hundreds and thousands of miles were common. This was a large expenditure in times of rising transportation costs and had to be abandoned in the great energy crises of the late 1980's. In 2100 beescaping enabled many hives to be based in the same spot all year as beekeepers made plantings to supply their hives with food, especially to fill the gaps in the local honeyflow. There is commonly a lack of nectar-producing plants blooming during May and June in the lowlands of the maritime Pacific Northwest. Before the days of beescaping many beekeepers had to transport their hives over the Cascades or up into the clearcuts for the fireweed, huckleberry and maple honeyflows.

In 2100, each area in the PNW had a network of bloom-watchers who kept track of significant areas of honey-plants, estimating bloom time and amount of bee forage available. This is transmitted to a computer center which correlates bee pasturage availability with beekeepers needs for additional pasturage so as to maximize honey production while minimizing transportation expenditures. Beekeeping associations and cooperatives have flourished. Co-operative ownership of extracting equipment is common.

The apiarists associations have acquired a great deal of influence in land-use planning. The planting and maintenance of honey plants along public and utility right-of-ways is common. Wherever the vast erosion-control and land rehabilitation projects blossomed in the 21st century, beekeepers were there making recommendations to include honeyplants. Honey production has become one of the multiple uses public forest and rangeland are managed for. Much of the arid and semi-arid lands in the interior Pacific Northwest now provide more income per acre from honey production than from livestock grazing.

spring brood rearing to build up hive numbers.

The most important period for making honey is during the sunny periods of summer after the hives have built up strength. Many of the the best honey-plants do not yield much nectar at temperatures under 70 degrees F. Especially is this true of mediterranean plants or species which have evolved in areas of dry, hot summer weather. Other honey-plants are adapted to nectar secretion even at low temperatures or during rainy weather, especially plants adapted to cool, maritime climates. Plants like the Ericaceae family (huckleberries, heather, Arbutus, Arctophylos) whose dangling bell-shaped flowers shed rain. The Institute plants many species from each category so as to have bee forage during inclement weather as well as high-yielders of nectar for sunny, hot weather in which the bees can bring in large quantities of nectar. These periods of high production are called **honeyflows**. The trick with beekeeping is to have enough quantities of the high-nectar yielding plants blooming throughout late spring and summer. Thus even though production will be low during bad weather periods there is adequate bee forage during any good weather periods to sustain a top-notch honeyflow. Beehives will gain as much as 10 to 20 pounds a day during good honeyflows.

Some plants secrete nectar and pollen (usually insect-pollinated). Other plants secrete pollen only (usually wind-pollinated). Some plants are attractive sources of nectar and/or pollen while others are less favored and used only in the absence of the more favored species. The most favored nectar plants are those which produce nectar freely, have the highest sugar content and are the easiest to collect; such as black locust (*Robinia pseudoacacia*), linden, hyssop, and sweet clover. The most favored pollen sources are those plants which have large sizes of pollen grains such as hollyhock, squash, and sunflower.

The Institutes research has shown how important it is for bee forage to be close to the hives in cool/moist climates. During inclement weather periods there are often short breaks in the weather when honeybees can make short forage runs. If the food source is somewhat distant from the hive then they stay home even during short breaks. Thus hives with food close by draw less heavily on stored honey during periods of rainy weather than hives with no close source. Hive workers will work an area of two miles radius from the hive if they need to, although they prefer to work close sources over distant sources if nectar quality is similar.

The best honey-flow plants are primarily from the following plant families; The **Labiatae** (examples include mints; hyssop, Salvia/sages, anise-hyssop, lavender, motherwort, Stachys, lemon balm) The **Leguminosae** (examples include clovers, alfalfa, trefoil, black locust, Caragana); The **Rosaceae** (examples include all the pome fruits such as apples, pears, Prunus such as cherry and plums; Rubus such as blackberries, raspberry); The **Ericaceae** (examples Vaccinium, huckleberry, blueberry, heather, Madrone,) and the **Compositae** (the ray flowers such as calendula, goldenrod, sunflower, asters).

The statistics in this story from the years before 1983 were taken from USDA Agricultural Census Reports.

and edges of waterways in the river floodplain had honeyplants such as camas, marshmallow, butterfly weed (*Asclepias tuberosa*), purple loosestrife, arrowhead, smartweed, teasel and others of economic value.

As a result of all this the director of the Puyallup Beescaping Institute pointed out that over 400 families gain their right livelihood from the multitude of plant and hive products which are derived from their 800 acres. Before PBI managed the land, the 800 acres supported one dairy farm family and several hired hands.

What a change! A landscape profuse with flowers of all colors, but especially the many shades of blue and lavenders - the honeybees favorite colors. Most honeybee pollinated plants use perfumes to attract insects. Add to the color and fragrance of hundreds of acres of flowers, the energetic buzzing and humming of millions of honeybees and you have an experience which entrances and delights the beekeeper from any time period."



For those interested in learning more about honey-plants and beescaping, the following books are recommended:

American Honey Plants by Frank C. Pellett. This is the foremost book written on the subject in North America thus far. Published in the 1950's. The honey flora of each state is covered along with extensive descriptions of many honey-plants. Much of this is gleaned from the beekeeping journals. I believe the book is available from Dadant & Sons.

Plants and Beekeeping. by F.N. Howes. 1979; Faber & Faber; London. Although written with British beekeepers in mind, it is of value to beekeepers of all temperate regions since Howes lists plants from all over the temperate world. The book contains chapters on establishing bee pasturage, bee gardens, apiary hedges, and a lengthy discussion of each major beeplant. This edition contains a supplementary bibliography which reviews the most prominent books written on the subject.

The Honey Plant Manual by Lovell (?) I am not sure of the title or the author, but it lists quite a bit of information on many beeplants. Anyone out there know more about it and availability?

Wagner Pea (*Lathyrus sylvestris wagneri*); Sainfoin; Serradella (*Ornithopus sativa*); **WILDFLOWERS**
PIEWEED (Petalobium); Asters; Goldenrod; Phacelia; Milkweed (*Asclepias*); Bugleweed (*Lycopus*); Chickory; Camas (*Camassia*); Gilia; Penstemon; Potentilla; Wood Mint (*Blephila ciliata*); Waterleaf (*Hydrophyllum virginicum*); Water Willow; Skunk Cabbage; Trichostema; Geranium; Crownbeard (*Verbesina*); Clarkia; Eschscholtzia; Gaillardia; Baby's Breath (*Gypsophila*); Arrowhead (*Sagittaria latifolia*); Lupinus; Mimulus; Spring Beauty (*Claytonia virginica*); Yarrow; Cleome; Baptisia; Coneflower (*Rudbeckia*); Erigeron; Evening Primrose (*Oenothera*); Geum; Golden Honey Plant (*Actinomeris squarrosa*); Gromwell (*Lithospermum*); Heuchera; Polemonium; Caltha palustris; Trillium; Veronica; Balsamroot; Wyethia; Bluecurls (*Trichostema*); Oxypetris; Astragalus; Paintbrush (*Castilleja*); Wild Sunflowers;

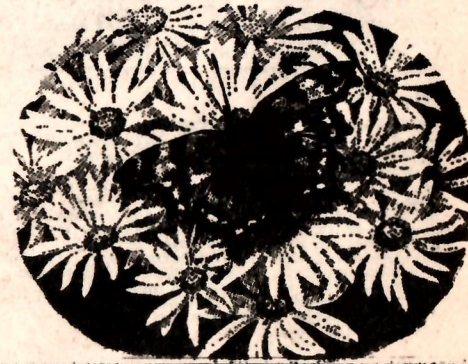
GARDEN FLOWERS
CARNEGIA; Cosmos; Nasturtium; Stative; Zinnia; Money-plant; Scabious; Impatiens; Begonia; Candytuft; Daffodils; Dahlia; Daisy; Echinops; Grape-hyacinth; Heliotrope; Hollyhock; Mignonette; Nemophila; Veronica; Poppy; Crocus; Sweet Alyssum; Sunflower; **VEGETABLES**

Onion; Garlic; Leek; other Allium; Asparagus; Cantalope; Watermelon; Squash; Pumpkin; gourds; cucumber; other cucurbitae; Carrot; Corn; Globe Artichokes; Mustard; Broccoli; Radishes; Turnip; Cabbage; other brassica; Lima Bean; Sunflower; Cardoon; Celery; Endive; Parsnip; **FIELD CROPS**
Buckwheat; Lima Bean; Safflower; Jerusalem Artichoke; Rape; Cotton; Sorghum; Cowpea (*Vigna sinensis*); Soybeans;

FIBER PLANTS
FLAX; Hemp; New Zealand Flax; Swamp Milkweed (*Asclepias tuberosa*); Black Indian Hemp (*Apocynum cannabinum*); **WEEDS**

Thistles (*Cirsium*); Amsinckia; Dandelion; Filaree (*Erodium*); Mustard; Chickweed; Knapweed (*Centaurea*); Mullein; Smartweed (*Polygonum*); Morning Glory/Bindweed (*Convolvulus*); Russian Thistle (*Salsola kali*); Teasel (*Dipsacus foliolonum*); Yellow Star Thistle (*Centaurea stotitialis*); Figwort (*Scrophularia*); Ragweed; Soapwort (*Saponaria*); Forget-me-not (*Myosotis*); Viper's Bugloss (*Echium vulgare*); Houndstongue (*Cynoglossum*); Gumweed (*Grindelia*); Tarweed (*Hemizonia*); Gorse (*Ulex*); Burdock;

See the Honey-plant Bloom Chart in the Seed Catalog for further information.





COMMON NAME INDEX & HONEY-PLANT BLOOM CHART

N= Supplies nectar and pollen P= Supplies pollen only T= Tree S= Shrub H= Herb V= Vine

COMMON NAME	BOTANICAL NAME	Early spring bloom	Late spring bloom	Summer bloom	Fall bloom
Alder (Red)	Alnus rubra.T.				P
American Plum	Prunus americana.T.				N
Amur Corktree	Phellodendron amurense.T.				N
Anise-hyssop	Agastache foeniculum.H.				N
Apricot (Ansu)	Prunus ansu.T.				N
Apricot (Sweet-pit)	Prunus armeniaca.T.				N
Arnica (Heart-leaved)	Arnica cordifolia.H.				N
Agrimony	Agrimonia eupatoria.H.				N
Arrow-leaved Balm-plant	Balsamorhiza sagitata.H.				N
Asparagus	Asparagus officinalis.H.				N
Autumn Olive	Elaeagnus umbellata.S.				N
Baby's Breath	Gypsophila paniculata.H.				N
Balloon Flower	Penstemon palmeri.H.				N
Basswood (American)	Tilia americana.T.				N
Bayberry (Northern)	Myrica pennsylvanica.S.				N
Bay Laurel	Laurus nobilis.T.				N
Beach Plum	Prunus maritima.S.				N
Beardtongue	Penstemon				N
Beauty Bush	Kolkwitzia amabilis.S.				N
Bee Tree	Evodia daniellii.T.				N
Birch (European White)	Betula pendula.T.				N
Birch (River)	Betula occidentalis.T.				N
Bittersweet	Celastrus scandens.V.				N
Bitterroot	Lewisia rediviva.H.				N
Bittersweet (Himalaya)	Rubus procerus.S.				N
Blackberry	Rubus leucodermis.S.				N
Blackcap Raspberry	Viburnum prunifolium.S.				N
Black Haw	Apocynum cannabinum.H.				N
Black Indian Hemp	Medicago lupulina.H.				N
Black Medic	Robinia pseudoacacia.T.				N
Black Locust	Morus nigra.T.				N
Black Mulberry	Salvia mellifera				N
Black Sage	Juglans nigra.T.				N
Black Walnut	Gaillardia aristata.H.				N
Blanketflower	Dicentra formosa.H.				N
Bleeding Heart	Ceanothus velutinus.S.				N
Blessed Thistle	Vaccinium corymbosum.S.				N
Blueberry (Highbush)	Ceanothus thyrsiflorus.S.				N
Blueblossom	Passiflora caerulea.V.				N
Passion Flower Vine	Sambucus caerulea.S.				N
Blue Elderberry	Gilia capitata.H.				N
Blue-headed Gilia	Parthenocissus tricuspidata.N				N
Boston Ivy	Ceanothus velutinus.S.				N
Buckbrush	Buddleia davidii.S.				N
Butterfly Bush	Cornus canadensis.S.				N
Bunchberry	Juglans cinera.T.				N
Butternut	Calendula officinalis.H.				N
Calendula	Camassia.H.				N
Camass	Catalpa speciosa.T.				N
Catalpa (Northern)	Nepeta cataria.H.				N
Catnip	Cedrus libani.T.				N
Cedar-of-Lebanon	Vitis agnus-castus.S.				N
Chaste Tree	Castanea mollissima.T.				N
Chestnut (Chinese)	Castanea sativa.T.				N
Chestnut (European)	Lomatium dissectum.H.				N
Chocolate Tips	Prunus virginiana.S.				N
Chokecherry	Clarkia pulchella.H.				N
Chokila (Elegant)	Carya sclarea.H.				N
Clary Sage	Aquilegia.H.				N
Columbine	Cornus mas.T.				N
Cornelian-cherry Dogwood	Coronilla varia.H.				N
Crownvetch	Helichrysum.H.				N
Curry Plant	Prunus insiticia.T.				N
Damson Plum	Cedrus deodara.T.				N
Deodar Cedar	Pseudoacacia menziesii.T.				N
Douglas Fir	Inula helenium.H.				N
Elecampane	Ilex aquifolium.T.				N
English Holly	Oenothera biennis.H.				N
Evening Primrose	Foeniculum vulgare.S.				N
Fennel	Epilobium angustifolium.HN				N
Fireweed	Digitalis purpurea.H.				N
Foxglove	Rumex scutellari.H.				N
French Sorrel	Sphaeralcea munroana.H.				N
Globe Mallow	Vitis coignetiae.V.				N
Glory Vine	Actinidia.V.				N
Chinese Gooseberries	Actinidia.V.				N
Gold Currant	Ribes aureum.S.				N
Golden Currant	Clematis tangutica.V.				N
Golden clematis	Laburnum angroides.T.				N
Goldenchain Tree	Lithospermum ruderale.H.				N
Goldenrain Tree	Penstemon rydbergii.S.				N
Gold Penstemon	Lithospermum ruderale.H.				N
Gromwell	Psidium cattleianum.T.				N
Grovel (Strawberry)	Spiraea douglasii.S.				N
Hardhack	Spiraea douglasii.S.				N
Haz (Siberian)	Corylus heterophylla.S.				N
Hazel (Western beaked)	Corylus cornuta.S.				N
Hickory (Pignut)	Carya glabra.T.				N
Highbush Cranberry	Viburnum trilobum.S.				N
Honeylocust	Gleditsia triacanthos.T.				N
Huckleberry (Big)	Vaccinium ananacum.S.				N
Huckleberry (Evergreen)	Vaccinium ovatum.S.				N
Huckleberry (Red)	Vaccinium parviflorum.S.				N
Hyssop	Hyssopus officinalis.S.				N
Japanese Heartnut	Juglans sieboldiana.T.				N
Japanese Raisin-tree	Hovenia dulcis.T.				N
Jujube	Zizyphus jujube.T.				N
Kiwi-fruit	Actinidia chinensis.V.				N
Lemon Balm	Melissa officinalis.H.				N
Licorice Root	Glycyrrhiza glabra.H.				N
Lobelia	Lobelia inflata.H.				N
Lomatium (Large-fruited)	Lomatium macrocarpon.H.				N
Logan	Eriobotrya japonica.T.				N
Loquat	Levisticum officinale.H.				N
Lovage	Arbutus menziesii.T.				N
Madrone	Schisandra chinensis.V.				N
Magnolia Vine	Calochortus eurycarpus.H.				N
Mariposa Lily (Big-pod)	Althaea officinalis.H.				N
Marshmallow	Mespilus.T.				N
Medlar					

Early spring bloom
Late spring bloom
Summer bloom
Fall bloom



Mormon Tea	Ephedra viridis.S.				
Mother of Thyme	Thymus serpyllum.H.				N
Motherwort	Leonurus cardiaca.H.				N
Mountain Mahogany	Cercocarpus montanus.S.				N
Nanking Cherry	Prunus tomentosa.S.				N
Nettle	Urtica dioica.H.				N
Nettle-leaf Horsemint	Agastache urticifolia.H.				N
Oceanspray	Holodiscus discolor.S.				N
Oregon Grape	Mahonia.S.				N
Origanum	Origanum vulgare.H.				N
Osage Orange	Maclura pomifera.S.				N
Pacific Dogwood	Cornus nuttallii.T.				N
Pasque-flower	Anemone occidentalis.H.				N
Pawpaw	Asimina triloba.T.				N
Peach (Siberian C)	Prunus persica.T.				N
Persimmon (American)	Diospyros virginiana.T.				N
Port Orford Cedar	Chamaecyparis lawsoniana.				N
Prairie Smoke	Geum triflorum.H.				N
Prinsepia-cherry	Prinsepia sinensis.S.				N
Purple Cone-flower	Echinacea purpurea.H.				N
Purple Loosestripe	Lythrum salicaria.H.				N
Purple Sage	Salvia dorrii carnosus.S.				N
Queen-of-the-Meadow	Eupatorium purpureum.H.				N
Quince	Cydonia oblongata.S.				N
Redwood	Sequoia sempervirens.T.				N
Rock-rose	Cistus purpureus.S.				N
Rocky Mountain Juniper	Juniperus scopulorum.T.				N
Rocky Mountain Maple	Acer glabrum.T.				N
Rose-of-Sharon	Hibiscus syriacus.S.				N
Round-leaved Alum-root	Heuchera cylindrica.H.				N
Royal Paulownia	Paulownia tomentosa.T.				N
Russet Buffaloberry	Eugenia canadensis.S.				N
Russian Mulberry	Morus alba tatarica.T.				N
Russian Olive	Elaeagnus angustifolia.T.				N
Sala	Gaultheria shallon.S.				N
Salmonberry	Rubus spectabilis.S.				N
Silk Cherry	Prunus besseyi.S.				N
Sage (Garden)	Salvia officinalis.H.				N
Scarlet Begonia	Monarda didyma.H.				N
Scarlet Gilia	Gilia aggregata.S.				N
Sea Buckthorn	Hippophae rhamnoides.S.				N
Self-heal	Prunella vulgaris.S.				N
Sequoia	Sequoiadendron giganteum.T.				N
Serviceberry (Western)	Amelanchier alnifolia.S.				N
Shooting Star	Dodecatheon.H.				N
Showy Fleabane	Shibboleth speciosa.S.				N
Shrubby Penstemon	Penstemon fruticosus.S.				N
Siberian Ginseng	Acanthopanax senticosus.S.				N
Siberian Pea-shrub	Caragana arborea.S.				N
Silktassel	Garrya elliptica.S.				N
Silk Tree	Albizia julibriss.S.				N
Silverberry	Elaeagnus commissa.S.				N
Silver Buffaloberry	Shepherdia argentea.S.				N
Smoketree	Cotinus coccinea.S.				N
Snowberry	Symphoricarpos alba.T.				N
Snow Gum	Eucalyptus nigra.T.				N
Sour Cherry	Prunus cerasus.S.				N
Sourwood	Oxydendrum arboreum.S.				N
Spina Currant	Ribes cereum.S.				N
Strawberry Tree	Eriogonum speciosum.S.				N
Sunrose	Helianthus scaberrimus.S.				N
Sweet Marjoram	Origanum onites.S.				N
Sweet William	Dianthus barbatus.S.				N
Tara Vine	Actinidia chinensis.V.				N
Tartarian Honeysuckle	Lonicera xylosteum.S.				N
Thimbleberry	Rubus parviflorus.S.				N
Threadleaf Phacelia	Eriogonum speciosum.S.				N
Thyme	Thymus serpyllum.H.				N
Trazel	Trifolium pratense.S.				N
Triteleia (Large-flowered)	Triteleia grandiflora.S.				N
Tulip Tree	Liriodendron tulipifera.L.				N
Turkish Tree Hazel	Corylus heterophylla.S.				N
Valerian	Valeriana officinalis.H.				N
Virginia Creeper	Parthenocissus tricuspidata.N				N
Walnut (Russian)	Juglans regia.T.				N
Western Blue Flag	Clematis recta.S.				N
Western Clematis	Clematis recta.S.				N
Western Larch	Larix laricina.T.				N
Western Red Cedar	Thuja occidentalis.T.				N
White Mulberry	Morus alba.T.				N
Witch-hazel	Hamamelis virginica.S.				N
Woolly Betony	Eriogonum speciosum.S.				N
Yellowbell	Penstemon uniflorus.S.				N
Yellow Penstemon	Penstemon uniflorus.S.				N
Yellow Rattle	Rhinanthus crista-galli.H.				N

HOW FAST CAN BEES MAKE HONEY ?

Gains can be spectacular if a major bloom coincides with good weather and strong hives. Hives gaining 17 pounds in one day from Tupelo bloom have been reported in Louisiana; 50 pounds in 3 days on vetch in Forest Grove, Oregon; 11 hives making 1320 pounds of honey in 11 days on milkweed (120 lbs. average). Beekeepers in Australia report that on commercial fields of lavender (Lavandula stoechas) they get a ton of fine-flavored honey per acre with 10 to 20 hives to the acre. That is \$1500/acre worth of honey at 75 cents/lb. From the honey alone !

