

NECTAR AND POLLEN PLANTS

BY EVERETT OERTEL¹

A beekeeper must have available data on the nectar and pollen plants in the vicinity of his apiary for successful honey production. Such information enables him to determine when to install package bees, divide colonies, put on supers, use swarm-control measures, remove honey, requeen, prepare colonies for winter, and locate profitable apiary sites.

Vansell (1931) listed 150 species of nectar and pollen plants in California, but only six are principal sources for commercial honey production. He listed about 90 species of nectar and pollen plants in Utah but noted that the main sources of commercial honey are alfalfa and sweetclover (1949). Wilson et al. (1958) observed honey bees visiting the blossoms or extrafloral nectaries of 110 species of plants in Colorado, of which the most important honey sources were alfalfa, yellow sweetclover, and dandelion (fig. 1).



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FIGURE 1.—Honey bee on a white clover blossom.

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Beekeepers are advised to record the blossoming period for the nectar and pollen plants in their vicinity (fig. 1). Most State agricultural extension services have publications available on beekeeping. These publications usually contain a list of the important nectar and pollen plants. Unknown plants can be sent to the botany department of the State university for identification.

Beekeeping Locations

Beekeepers, especially commercial operators, have learned that the nectar- and pollen-producing plants may change considerably over the years. Variations may be caused by droughts, changes in agricultural crops and practices, irrigation projects, and subdivision development. Changes have been particularly rapid since World War II and are likely to continue.

Acreages planted to buckwheat, alsike clover, and cotton have decreased, whereas those with alfalfa hay, mustard, safflower, and soybeans have increased. In some States, certain soybean varieties are valuable sources of nectar.

Other changes in agricultural practices include the use of herbicides and power mowing machines. They reduce or eliminate plants that are important sources of nectar or pollen. Farmers are depending less on legumes to add nitrogen to the soil and are using more fertilizer.

Pests, such as insects or nematodes, may cause so much damage to some plant species that farmers change to other crops. In Ohio in 1966, the alfalfa weevil (*Hypera postica* (Gyllenhal)) became so destructive that there was serious concern farmers would stop growing alfalfa, an important nectar source. The sweetclover weevil (*Sitona cylindricollis* Fahraeus) has destroyed much of the sweetclover that formerly was grown in the Midwest. The acreage planted for seed has decreased over 50 percent since 1950. Plant breeders have introduced a nectarless cotton so that destructive insects will not be attracted to the plant.

No information is available on the effects of air pollution caused by factories, motor vehicles, radioactivity, and major metropolitan areas on nectar and pollen plants except in limited areas. Productive locations for the commercial beekeeper will become more difficult to find.

Poisonous Honey Plants

Fortunately, the American beekeeper is seldom concerned about plants that are poisonous to honey bees. Locations with abundant growth of California buckeye (*Aesculus* spp.), deathcamas (*Zigadenus venenosus*), locoweed (*Astragalus* or *Oxytropis* spp.), laurel (*Kalmia* sp.), or rhododendron (*Rhododendron* spp.) should be avoided, if possible, while these plants are in bloom. Damage to colonies from poisonous nectar or pollen may be severe in some years, but of small consequence in others.

Nectar Secretion

Beginners in beekeeping frequently ask: "Are there any plants that I can grow that will increase my yield of honey?" In general, growing a crop for the bees alone is economically impractical. Beekeepers are dependent on cultivated crops grown for other purposes or on plants growing wild. Certain nectar and pollen plants, such as alfalfa, the clovers, and sweetclover, are grown widely for agricultural purposes and they are wild to some extent. These plants, together with others, such as citrus (orange, grapefruit, lemon, limes, tangelos), cotton, sage and tupelo, furnish the greater part of the Nation's commercial honey.²

Sometimes, friendly farmers will seed small areas near an apiary with nectar-producing species, if the beekeeper provides the seed, and thus honey production increases. A few ornamental flowers or trees on a city lot are of small value to an apiary or a colony of bees. Up to several acres of abundant flowers are usually necessary to provide sufficient nectar for one colony (Oertel 1958).

Nectar secretion or production is affected by such environmental factors as soil type, soil condition, altitude, latitude, length of day, light

conditions, and weather. Such soil conditions as fertility, moisture, and acidity may affect not only the growth of the plant but also the secretion of nectar. Luxuriant plant growth does not necessarily imply that maximum nectar secretion will take place. At times, limited growth results in increased nectar production. Clear, warm, windless days are likely to favor nectar secretion. Most of our information on nectar production is based only on casual observation.

Nectar is secreted by an area of special cells in the flowers called a nectary. Certain species, such as vetch, cotton, partridgepea, and cowpeas, produce nectar from tiny specialized areas in the leaves or stems called extrafloral nectaries.

Honeydew

Honeydew is the sweet liquid secreted by certain insects, such as aphids or plant lice, scale insects, gall insects, and leafhoppers, and also by the leaves of certain plants. Honeydew honey differs chiefly from floral honey in its higher dextrin and mineral content. The quality of honeydew honey varies greatly. Some types are fairly palatable, whereas others are undesirable for human food or for wintering bees in northern areas.

Pollen Plants

Pollen is an essential food used in the rearing of honey bee larvae and maturing of young worker bees. A good, strong colony of bees may collect and use 50 to 100 pounds of pollen during the season. Lack of pollen slows colony development in many localities in the spring and in some locations in the summer and fall. Pollen may be available in the field, but cold or rainy weather may prevent the bees from gathering it. Some beekeepers feed pollen supplements, alone or mixed with bee-gathered pollen, to their colonies. Pollen supplements are sold by bee-supply dealers.

Nectar and Pollen Plant Regions

In table 1 the nectar and pollen plants are listed by region (fig. 1, p. 16). Some species are limited to a small area within a region; for example, thyme in New York, fireweed in the North and West, gallberry in the Southeast, and citrus in the Southeast, Southwest, and West.

² The reader who wishes to read a detailed account of the production of nectar is referred to the chapter by R. W. Shue in *The Hive and the Honey Bee*, 1975, Dadant & Sons, Hamilton, Ill. 740 p.

TABLE 1.—Nectar and pollen plants by regions

Plant	North-east	North-central region	South-east ¹	Plains region	Moun-tainous region ²	South-west	West ³	Alaska ⁴	Hawaii ⁵
Alder (<i>Alnus</i> spp.)						X	X	X	
Alfalfa (<i>Medicago sativa</i> L.)	X	X		X	X	X	X	X	
Algaroba (<i>Prosopis chilensis</i> (Mol.) Stuntz)									X
Alkaliweed (<i>Hemizonia</i> spp.)							X		
Almond (<i>Prunus amygdalus</i> Batsch.)							X		
Amsinckia (<i>Amsinckia</i> spp.)							X		
Ash (<i>Fraxinus</i> spp.)					X	X			
Aster (<i>Aster</i> spp.)	X	X	X	X		X	X		
Baccharis (<i>Baccharis</i> spp.)						X			
Balsamroot (<i>Balsamorhiza</i> spp.)					X				
Basswood (<i>Tilia americana</i> L.)	X	X	X	X	X				
Bermudagrass (<i>Cynodon dactylon</i> (L.) Pers.)						X	X		
Bindweed (<i>Convolvulus</i> spp.)					X	X			
Birdsfoot trefoil (<i>Lotus conculatus</i> L.)	X						X		
Bitterweed (<i>Helenium amarum</i> (Raf.) Rock)			X						
Blackberry (<i>Rubus</i> spp.)	X		X				X		X
Black wattle (<i>Acacia</i> spp.)									X
Bladderpod (<i>Lesquerella gordonii</i> (Gray) Wats.)						X			
Blueberry (<i>Vaccinium</i> spp.)	X	X						X	
Bluecurls (<i>Trichostema</i> spp.)							X		
Blue thistle (<i>Echium vulgare</i> L.)	X		X						
Bluevine (<i>Gonolobus laevis</i> Michx.)		X							
Blueseed (<i>Cichorium intybus</i> L.)							X		
Boneset (<i>Eupatorium</i> spp.)			X	X				X	X
Boxelder (<i>Acer</i> spp.)					X				
Broomweed (<i>Gutierrezia texana</i> (DC.) T. & G.)				X	X	X			
Buckbrush (<i>Symphoricarpos</i> spp.)		X		X		X			
Buckeye (<i>Aesculus californica</i> (Spach) Nutt)							X		
Buckthorn (<i>Rhamnus</i> spp.)	X		X	X		X	X		
Buckwheat (<i>Fagopyrum esculentum</i> Moench)		X	X						
Burroweed (<i>Haplopappus tenuisectus</i> (Greene) Blake ex Benson)					X	X			
Button bush (<i>Cephalanthus occiden- talis</i> L.)	X	X	X	X			X		
Cacti (<i>Cactaceae</i> family)						X			X
Camphorweed (<i>Heterotheca subaxil- laris</i> (Lam.) Britt. & Lusby)					X	X			
Cascara (<i>Rhamnus purshiana</i> DC.)							X		
Catclaw (<i>Acacia greggii</i> Gray)						X			
Catnip (<i>Nepta cataria</i> L.)	X	X							
Ceanothus (<i>Ceanothus</i> spp.)					X	X			
Cedar elm (September elm) (<i>Ulmus serotina</i> Sarg.)				X					
Chicory (<i>Chichorium intybus</i> L.)	X	X	X	X	X	X	X		
Chinese tallow tree (<i>Sapium sebiferum</i> L.)			X			X			

See footnotes at end of table.

TABLE 1.—Nectar and pollen plants by regions—Continued

Plant	North-east	North-central region	South-east ¹	Plains region	Mountainous region ²	South-west	West ³	Alaska ⁴	Hawaii ⁵
Citrus (<i>Citrus</i> spp.)			X			X	X		X
Cleome (<i>Cleome serrulata</i> Pursh)					X	X	X		
Clethra (<i>Clethra alnifolia</i> L.)	X								
Clover:									
Alsike (<i>Trifolium hybridum</i> L.)	X	X			X		X	X	
Crimson (<i>Trifolium incarnatum</i> L.)			X						
Persian (<i>Trifolium resupinatum</i> L.)	X	X	X	X					
Red (<i>Trifolium pratense</i> L.)	X	X		X	X		X	X	X
Sweetclover (<i>Melilotus</i> spp.)	X	X	X	X	X	X	X		X
White (<i>Trifolium repens</i> L.)	X	X	X	X	X		X	X	X
Coffee (<i>Coffea arabica</i> L.)									X
Cone flower (<i>Rudbeckia</i> spp.)	X	X	X						
Corn (<i>Zea mays</i> L.)		X	X	X	X	X	X		
Cotton (<i>Gossypium</i> spp.)			X	X		X	X		
Cottonwood (<i>Populus</i> spp.)			X		X	X	X		
Cowpea (<i>Vigna sinensis</i> (Torner) Savi)			X						
Cranberry (<i>Vaccinium macrocarpon</i> Ait.)	X	X					X		
Creosote bush (<i>Larrea tridentata</i> (DC.) Coville)						X	X		
Crownbeard (<i>Verbesina</i> spp.)			X	X		X			X
Cucurbits:									
Cantaloup (<i>Cucumis melo</i> L.)	X	X	X	X		X	X		
Cucumber (<i>Cucumis</i> spp.)	X	X	X	X	X	X	X		
Gourds (<i>Cucurbita</i> spp.)	X	X	X						
Melon (<i>Citrullus</i> spp.)	X	X	X			X	X		
Pumpkin (<i>Cucurbita</i> spp.)	X	X	X		X		X		
Squash (<i>Cucurbita</i> spp.)	X	X	X				X		
Dandelion (<i>Taraxacum</i> spp.)	X	X			X		X	X	X
Dogbane (<i>Apocynum androsaemifolium</i> L.)	X	X	X						
Eardropvine (<i>Brunnichia cirrhosa</i> Gaertn.)			X						
Elm (<i>Ulmus</i> spp.)	X	X	X	X	X	X			
Eucalyptus (<i>Eucalyptus</i> spp.)						X	X		X
Filaree (<i>Erodium</i> spp.)						X	X		
Fireweed (<i>Epilobium angustifolium</i> L.)		X					X		
Fruit bloom:									
Apple (<i>Malus</i> spp.)	X	X	X	X	X		X	X	
Apricot (<i>Prunus</i> spp.)					X	X	X		
Cherry (<i>Prunus</i> spp.)	X	X			X		X		
Citrus (<i>Citrus</i> spp.)			X			X	X		X
Peach (<i>Prunus</i> spp.)	X	X	X	X	X	X	X		
Pear (<i>Pyrus</i> spp.)	X	X	X	X	X		X		
Plum (<i>Prunus</i> spp.)	X	X	X	X	X		X		
Gallberry (<i>Ilex glabra</i> (L.) Gray)			X						
Giant hyssop (<i>Agastache foeniculum</i> (Pursh) Ktse.)	X	X							
Goldenrod (<i>Solidago</i> spp.)	X	X	X	X	X	X			X
Grape (<i>Vitis</i> spp.)			X						

See footnotes at end of table.

TABLE 1.—Nectar and pollen plants by regions—Continued

Plant	North-east	North-central region	South-east ¹	Plains region	Moun-tainous region ²	South-west	West ³	Alaska ⁴	Hawaii ⁵
Greasewood (<i>Sarcobatus vermiculatus</i> (Hook.) Torr.)					X				
Guajillo (<i>Acacia berlandieri</i> Benth.)						X			X
Guava (<i>Psidium guajava</i> L.)									
Gumweed (<i>Grindelia</i> spp.)				X	X	X			
Hemp (<i>Cannabis sativa</i> L.)							X		
Holly (<i>Ilex opaca</i> Ait.)			X						
Horsemint (<i>Monarda</i> spp.)				X		X			
Huckleberry (<i>Gaylussacia</i> spp.)			X						
Hue (<i>Lagenaria siceraria</i> (Mol.) Standley)									X
Ilima (<i>Sida</i> spp.)									X
Jackass clover (<i>Wislizenia refracta</i>)							X	X	
Johnsongrass (<i>Sorghum halepense</i> (L.) Pers.)						X	X		
Kly (<i>Acacia</i> spp.)									X
Knapweed (<i>Centaurea repens</i> L.)					X				
Koa haole (<i>Acacia</i> spp.)									X
Lantana (<i>Lantana</i> spp.)									X
Laurel cherry (<i>Prunus caroliniana</i> Mill.)	X	X	X						
Lima beans (<i>Phaseolus limensis</i> Macf.)			X				X		
Locoweed (<i>Oxytropis</i> or <i>Astragalus</i> spp.)					X	X			
Locust:									
Black (<i>Robinia pseudo-acacia</i> L.)	X	X	X	X	X	X			
Thorny (<i>Gleditsia triacanthos</i> L.)			X						
Water (<i>Gleditsia aquatica</i> Marsh)			X						
Looses rife (<i>Lythrum</i> spp.)	X	X							
Lupine (<i>Lupinus</i> spp.)						X	X		
Macadamia (<i>Macadamia</i> spp.)									X
Mamane (<i>Sophora</i> spp.)									X
Mangrove:									
Black (<i>Avicennia nitida</i> Jacq.)			X						
Red (<i>Rhizophora mangle</i> L.)			X						
White (<i>Laguncularia racemosa</i> (L.) Gaertn. F.)			X						
Manzanita (<i>Arctostaphylos</i> spp.)					X	X	X		
Maple (<i>Acer</i> spp.)	X	X	X	X	X		X		
Matchweed (<i>Gutierrezia sarathrae</i> (Pursh) Britt. & Rusby)					X	X			
Mesquite (<i>Prosopis juliflora</i> (SW.) DC.)						X	X		
Mexican clover (<i>Richardia scabra</i> L.)			X						
Milkvetch (<i>Astragalus</i> spp.)					X				
Milkweed (<i>Asclepias</i> spp.)	X	X	X	X	X				
Mint (<i>Mentha</i> spp.)		X	X				X		
Monkeypod (<i>Samanea</i> spp.)									X
Mountain apple (<i>Eugenia malaccensis</i> L.)									X
Mule ear (<i>Wyethia</i> spp.)					X				
Mustard (<i>Brassica</i> spp.)		X			X	X	X	X	
Nohu (<i>Tribulus cistoides</i> L.)									X
Oak (<i>Quercus</i> spp.)			X		X	X	X		

See footnotes at end of table.

TABLE 1.—Nectar and pollen plants by regions—Continued

Plant	North-east	North-central region	South-east ¹	Plains region	Moun-tainous region ²	South-west	West ³	Alaska ⁴	Hawaii ⁵
Ohia lenhua (<i>Metrosideros</i> spp.)									X
Oi (<i>Verbena</i> spp.)									X
Oregon grape (<i>Berberis nervosa</i> Pursh)							X		
Oregon maple (<i>Acer macrophyllum</i> Pursh)							X		
Paintbrush (<i>Castilleja</i> spp.)									X
Palmetto (<i>Sabel</i> spp.)			X						
Palmetto, saw (<i>Serenoa repens</i> (Bartr.) Small)			X						
Palm trees (<i>Palmaceae</i> family)									X
Partridgepea (<i>Chamaecrista</i> spp.)			X						
Pepperbush (<i>Clethra alnifolia</i> L.)			X						
Peppervine (<i>Ampelopsis arborea</i> (L.) Koehne)			X	X					
Persimmon (<i>Diospyros virginiana</i> L.)			X	X					
Pili (<i>Heteropogon contortus</i> (L.) Beauv. ex Roem. & Schutt.)									X
Pine (<i>Pinus</i> spp.)							X		
Pluchea (<i>Pluchea</i> spp.)									X
Poison ivy (<i>Rhus</i> spp.)	X	X	X					X	
Poison oak (<i>Rhus</i> spp.)	X	X	X					X	
Privet (<i>Ligustrum</i> spp.)	X	X	X			X			
Poplar (<i>Populus</i> spp.)	X	X	X	X	X			X	
Rabbitbrush (<i>Chrysothamnus</i> spp.)					X	X			
Ragweed (<i>Ambrosia</i> spp.)		X	X	X	X	X			
Rape (<i>Brassica napus</i> L.)				X					
Raspberry (<i>Rubus</i> spp.)	X	X	X				X	X	
Rattenvine (<i>Berchemia scandens</i> (Hill) K. Koch)			X	X					
Redbud (<i>Cercis canadensis</i> L.)			X	X					
Resinweed (<i>Grindelia</i> spp.)				X		X			
Russian-thistle (<i>Salsola</i> spp.)				X	X	X	X		
Safflower (<i>Carthamus tinctorius</i> L.)					X	X	X		
Sage (<i>Salvia</i> spp.)	X	X	X	X			X		
Saguaro (<i>Carnegiea gigantea</i> (Engelm.) Britt. & Rose)						X			
Sainfoin (<i>Onobrychis</i> spp.)					X				
Saltcedar (<i>Tamarix gallica</i> L.)					X	X	X		
Santa maria (<i>Parthenium hysterophorus</i> L.)			X						
Silky oak (see silver oak)									X
Silver oak (<i>Grevillea robusta</i> A. Cunn.)									X
Smartweed (<i>Polygonum</i> spp.)	X	X	X	X		X	X		
Snakeweed (see matchweed)					X	X			
Snowberry (<i>Symphoricarpos occidentalis</i> L.)	X	X	X						
Snowvine (<i>Mikania scandens</i> (L.) Willd.)			X						
Sorghum (<i>Sorghum</i> spp.)				X		X	X		
Sourwood (<i>Oxydendrum arboreum</i> (L.) DC.)			X						
Soybeans (<i>Glycine max</i> (L.) Merr.)		X	X						
Spanish-needles (<i>Bidens bipinnata</i> L.)		X	X	X					
Star thistle (<i>Centaurea solstitialis</i> L.)							X		

See footnotes at end of table.

TABLE 1.—Nectar and pollen plants by regions—Continued

Plant	North-east	North-central region	South-east ¹	Plains region	Moun-tainous region ²	South-west	West ³	Alaska ⁴	Hawaii ⁵
Star thistle (<i>Centaurea maculosa</i>)		X					X		
Sumac (<i>Rhus</i> spp.)	X	X	X	X					
Summer farewell (<i>Petalostemum</i> spp.)			X						
Sunflower (<i>Helianthus</i> spp.)			X	X		X			
Tamarix (<i>Tamarix aphylla</i> (L.) Karst.) (<i>Tamarix articulata</i> Vahl)						X	X		
Tarweed (<i>Hemizonia</i> spp.)							X		
Thistle (<i>Sonchus arvensis</i> L. and <i>Cirsium</i> spp.)			X		X				
Canadian (<i>Cirsium arvense</i> (L.) Scop.)							X		
Thyme (<i>Thymu</i> spp.)	X								
Tievine (<i>Convolvulus</i> or <i>Ipomoea</i> spp.)			X	X					
Titi:									
Black (<i>Cliftonia monophylla</i> (Lam.) Britton ex Sarg.)			X						
Spring (<i>Cyrilla racemiflora</i> L.)			X						
Summer (<i>Cyrilla</i> spp.)			X						
Toyon (<i>Photinia arbutifolia</i> Lindl.)							X		
Tulip poplar (<i>Liriodendron tulipifera</i> L.)	X	X	X						
Tupelo (<i>Nyssa</i> spp.)			X						
Vervain (<i>Verbena</i> spp.)			X						
Vetch (<i>Vicia</i> spp.)			X	X	X		X		X
Vine maple (<i>Acer circinatum</i> Pursh)							X		
Wild alfalfa (<i>Lotus</i> spp.)							X		
Wild buckwheat (<i>Eriogonum</i> spp.)					X	X	X		
Wild currants (<i>Ribes</i> spp.)			X		X				
Wild dandelion (<i>Hymenopappus areno-</i> <i>sus</i> Heller)					X				
Wild snowberry (<i>Symphoricarpos</i> spp.)					X				
Willow (<i>Salix</i> spp.)	X	X	X	X			X	X	
Wingstem (<i>Actinomeris alternifolia</i> (L.) DC.)			X						
Yellow ginger (<i>Hedychium flavescens</i> Carey)									X
Yellow-rocket (<i>Barbarea vulgaris</i> R. Br.)	X	X							

¹ Morton, J. F. Honeybee Plants of South Florida. 1964. 77th Proceedings of the Florida State Horticultural Society, p. 415-36.

² Wilson, W. T., J. O. Moffett, and H. D. Harrington. 1958. Nectar and Pollen Plants of Colorado. Colorado Agricultural Experiment Station Bulletin 503-S, 72 p.; Vansell, G. H. Pollen and Nectar Plants of Utah. 1949. Utah Agricultural Experiment Station Circular 124, 28 p.

³ Vansell, G. H. Nectar and Pollen Plants of California. 1931. California Agricultural Experiment Station Bulletin 517, 55 p.

⁴ Washburn, R. H. Beekeeping in the Land of the Midnight Sun. 1961. Gleanings in Bee Culture 89: 720-723, 756.

⁵ Botanical names taken from M. C. Neal, Gardens of Hawaii. 1965. (Honolulu) Bishop Museum Special Publication 50, 924 p.; nectar and pollen names taken from E. J. Dyce, Beekeeping in the 50th State. 1959; Gleanings in Bee Culture 87: 647-651; and J. E. Eckert and H. A. Bess, Fundamentals of Beekeeping in Hawaii. 1952. Hawaii University Bulletin 35, 32 p.

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