POLLINATOR PARTNERSHIP

http://www.pollinator.org

Statement of
Laurie Davies Adams
Executive Director
Pollinator Partnership, San Francisco, California

Before the
Subcommittee on Horticulture and Organic Agriculture
Committee on Agriculture
U.S. House of Representatives

June 26, 2008

Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to testify about the status of research and other activities related to the health of honeybees and other pollinators. My name is Laurie Davies Adams, and I am Executive Director of the Pollinator Partnership.

INTEREST OF THE POLLINATOR PARTNERSHIP:

The Pollinator Partnership (P2)[1] is a nonprofit organization headquartered in San Francisco, California. P2's mission is to catalyze stewardship of biodiversity. P2 places a high priority on efforts to protect and enhance animal pollinators (*invertebrates, birds and mammals*) and their habitats in both working and wild lands. More information about P2 may be accessed at http://www.pollinator.org.

P2 is a strong advocate of a collaborative, science-based approach. P2 is honored to have a number of beneficial pollinator partnership efforts ongoing through management of the North American Pollinator Protection Campaign (NAPPC), a tri-national, public-private collaboration of scientific researchers, managers and other employees of state and federal agencies, private industry and conservation and environmental groups dedicated to ensuring sustainable populations of pollinating invertebrates, birds and mammals throughout the United States, Canada and Mexico. NAPPC's voluntary participants from over 125 entities are working together to proactively:

- Promote awareness and scientific understanding of pollinators;
- Gather, organize and disseminate information about pollinators;
- Provide a forum to identify and discuss pollinator issues; and
- Promote projects, initiatives and activities that enhance pollinators.

Since its founding in 1999, NAPPC has been an instrumental cooperative conservation force in focusing attention on the importance of pollinators and the need to protect them throughout North America. More information about NAPPC and its collaborative efforts can be found at http://www.nappc.org.

[1] Founded as the Coevolution Institute, now does business as the Pollinator Partnership.

NEW ECOREGIONAL GUIDES TOOL FOR NATIVE HABITAT FOR POLLINATORS:
To empower stakeholders with the information needed to move forward with pollinator habitat conservation efforts on the ground, P2 is pleased to announce the National Pollinator Week launch of the first six in a new series of practical Ecoregional Guides, "**Selecting Plants for Pollinators.**" There are 35 ecoregions in the United States, and within two years there will be a guide released for each ecoregion. Two new guides each will be released in July, August and September.

These guides are intended to be practical tools for farmers, ranchers and gardeners who want to establish habitat for honeybees and native pollinators through native plants that are specific to their own region. The guides are available in downloadable form for free at http://www.pollinator.org along with information about how to use them. **Exhibit 1** is a short Q&A on the guides. **Exhibit 2** is a 1-page flier on the new guides that is being widely distributed.

What is an ecoregion? Why aren't we developing guides by state or county or other familiar geographic delineation? Scientists in USDA and elsewhere told us that plants and pollinators don't "think" along state or county lines. Scientists recommended that we use an established system of ecoregions that could be used to match native plants and pollinators. Ecoregions (ecological regions, or bioregions) denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources. The biodiversity of flora, fauna (including pollinators) and ecosystems that characterize an ecoregion tend to be distinct from that of other ecoregions. These general purpose regions are critical for structuring and implementing ecosystem management strategies across federal agencies, state agencies, and nongovernment organizations that are responsible for different types of resources within the same geographical areas.

You have no idea what your ecoregion address is? P2 was struggling with a way to connect this tool to potential users. Our partners at the National Biological Information Infrastructure (NBII) pointed us to an existing online system. NBII is a broad, collaborative program to provide increased access to data and information on the nation's biological resources.

All you need is your zip code, and our online **Zip Code Habitat Locator** will connect you to your ecosystem map and guide. If the guide for your ecoregion is not yet available, you can enter your e-mail address and receive an alert when it becomes available.

For illustrative purposes, **Exhibit 3** is the full ecoregional guide for the Central Appalachian Broadleaf Forest. As indicated on the map on page 7 of the guide, this ecoregion includes the District of Columbia and parts of Virginia and Maryland, with the region portions of states from Pennsylvania to South Carolina. The first part of each guide covers standard information, including:

- Why pollinators are important, and Getting started
- Understanding the ecoregion covered by the guide
- Meet the pollinators, and Which flowers the pollinators prefer
- Developing landscape plantings that provide pollinator habitat
- Tips for—Farmers, Public land managers, and Home landscapes

P2/NAPPC HONEYBEE HEALTH TASK FORCE RESEARCH EFFORTS:
To help address multiple concerns about the health of our nation's honeybees, last fall P2 facilitated the establishment of a Honeybee Health Improvement Task Force through NAPPC. Top scientists from universities and federal agencies were recruited and teamed up with leading representatives of the beekeeping community.

Burt's Bees stepped up and donated vital funding to support the Task Force at NAPPC's International Pollinator Summit, hosted by the Department of Interior last October. P2 applauds the leadership provided by Burt's Bees and major contributions for research on honeybee health and sustainable pollination to the University of California-Davis and Penn State by Haagen Dazs. Haagen Dazs has joined the growing P2 team this year as a partner and sponsor. An exciting but less well known story is that individuals from all walks of life are also making contributions to help support pollinator health efforts, from school children to private individuals and foundations.

The Task Force has worked to identify specific research needs that would complement research being funded by USDA. In response to a request for proposals, nineteen eligible proposals were received from applicants all around North America, totaling more than $200,000 in funding requests. The caliber and diversity of the proposals received speak to the importance of and need for honeybee health research. The five one-year grants awarded cover a broad range of honey bee related topics such as the effects of climate or environmental variables, the effects of nutrition on honey bee physiology and/or colony health, the effects of sublethal doses of pesticides (including miticides) on honey bee physiology and/or colony health, and genetic stock improvement. A list of proposals that have been awarded follows:

- **"Assessment of sublethal effects of imidacloprid on honey bee and colony health"** (University of Maryland Foundation; Dively and Embrey)
- **"Diagnostic gene panel for honey bee breeding and disease management"** (USDA-ARS Bee Research Lab; Evans and Chen)
- **"Effects of miticide and Fumagilin-B on honey bee survivorship and immune responses"** (Acadia University; Little, Shutler, and others)
- **"Changes in hormonal and protein levels in honey bees that are experiencing migratory transportation"** (Michigan State University; Huang)
- **"Nutritional effects on intestinal health and longevity of honey bee workers"** (University of North Carolina at Greensboro; Rueppell)

A more complete description of the Honeybee Health Task Force and research projects is provided in **Exhibit 4** and at http://www.pollinator.org/honeybee_health.htm.

We appreciate the increasing efforts by the U.S. Department of Agriculture (USDA) to conduct and coordinate research on CCD and other challenges impacting honeybees and other pollinators, such as USDA's CCD research action plan launched last summer. We also applaud this Subcommittee, the Agriculture Committee and the Congress for enacting a new farm bill that for the first time includes pollinator-specific research and conservation provisions that lay the groundwork for additional action. The Pollinator Partnership is urging the Congress to provide additional funding for pollinator research and conservation in the Fiscal Year 2009 appropriations. We also urge the research and conservation agencies at USDA to take maximum advantage of the new pollinator provisions in the farm bill in implementing their programs.

NATIONAL POLLINATOR WEEK JUNE 22-28, 2008:
June 22-28, 2008 was designated as National Pollinator Week through a proclamation by Secretary of Agriculture Ed Schafer. A number of events across the nation to celebrate and *raise public awareness about our pollinating partners and the need to take actions that protect pollinators and their habitat*. For example—

- On June 25, P2 hosted a briefing on the status and plight of bees and other pollinators.
- Governors in 26 States have signed proclamations Pollinator Week at the State level.
- Pollinator Week activities and events are occurring in at least 38 States and Canada.
- P2 has launched the first six Ecoregional Guides, "Selecting Plants for Pollinators."
- P2 is signing a Memorandum of Understanding with the National Association of Conservation Districts (NACD), with the first action focused on the Ecoregional Guides.
- Pollinator Podcasts produced in partnership with the Department of Interior http://www.pollinator.org/podcast.htm.
- Free items, including "Bounty of Bees" Poster and Pollinator Wheels.

The goal is to encourage actions in support of pollinators through the year. More information is available at (http://www.pollinator.org/pollinator_week_2008.htm).

CoE stands ready to work with this Subcommittee and interested stakeholders to help ensure that honeybees and native pollinators are sustained for the benefit of agriculture, consumers and healthy ecosystems.

Respectfully Submitted,

Laurie Davies Adams
Executive Director

Exhibits (4)

POLLINATOR PARTNERSHIP

FAST FACTS

INTRODUCES ECOREGIONAL PLANTING GUIDES

WHY PLANT FOR POLLINATORS?

Loss of habitat was identified by the National Academy of Sciences as one of the contributing factors to the decline in pollinators. Bees, bats, birds, butterflies and other pollinators suffer from real estate scarcity.

Both commercial bees and natives are facing diminishing locations for floral resources and nesting; development and edge-to-edge commercial farming have contributed to fragmented migratory corridors for butterflies and hummingbirds.

WHAT ARE THE ECOREGIONAL GUIDES?

The Ecoregional Guides are a series of 24 page, beautifully illustrated booklets describing all that is needed in each Ecoregion of the 35 Bailey's Ecosystem Provinces.

To see a map of all the provinces go to: http://www.fs.fed.us/colorimagemap/ecoreg1_provinces.html
Each guide has a different cover illustrating the farming and wildlife communities of the location. Each has a customized plant list for the Ecoregion, a list of bloom periods, and habitat hints. Specific instructions are given for farmers, public land managers and home gardeners. Also included are how-to checklists, background on pollinators of all types, resources for further investigation, and a request for feedback. Because the guides are online, we can update them and make additions as we receive feedback from users.

ARE POLLINATOR HABITATS HELPFUL?

Of all the stressors on pollinator populations (pathogens and disease, invasive species, chemical assaults), creating clean and accessible habitat is something everyone can do NOW. And the benefits are almost immediate – bees, butterflies, hummingbirds are the visible evidence of healthier, chemical free gardens and hedgerows when pollinator habitat is establish in homes, farms, schools, parks, golf course and corporate lands.

HOW DO YOU GET A GUIDE?

The Ecoregional Guides are FREE for downloading at www.pollinator.org based on a roll-out schedule for all 35. Pollinator Partnership is currently seeking funding to print the guides to help those who need or prefer a printed version

WHAT'S YOUR ECOREGION?

Hardly anyone thinks about the ecoregion they live in – but political boundaries like streets, cities or states, don't matter to the natural creatures who share our neighborhood. These new guides have made it easy for ANYONE to discover their place in the natural habitats of the world using their zip code as a locator. When you're ready to Plant for Pollinators, enter a personal zip code that matches where you live or work onto the www.pollinator.org website, where you'll be matched to your specific ecoregion. You will be connected to a map that shows you all the other places to which you are connected. Just download your free guide to find your natural habitat.

HELP THE BEES AND OTHER POLLINATORS

BY PLANTING HABITAT IN YOUR GARDEN, FARM OR FOREST

Supporting bees and other pollinators who bring us one out of every third bite of our food and 80% of our flowering plants is vital and important job - one that **everyone** can help with.

A crucial first step is to create habitat for pollinators to use for food and shelter.

There are 35 Ecoregional guides being created by the Pollinator Partnership and NAPPC and they're designed to reach all who can plant for pollinators -- **that's everyone!**

The Guides have been created to be very user-friendly, effective and **FREE!**

VISIT: WWW.POLLINATOR.ORG
CLICK ON: FREE ECOREGIONAL GUIDES

Especially helpful for farmers and ranchers, land managers and gardeners, these guides help place **YOU** in your habitat.

Most of us think of our locale as our city, town, or county but our **REAL neighborhood on the planet is our Ecoregion.**

We have an **Ecoregion Locator using your zip code. Try it!**

MAKE A REAL DIFFERENCE NOW!

The North American Pollinator Protection Campaign and The Pollinator Partnership

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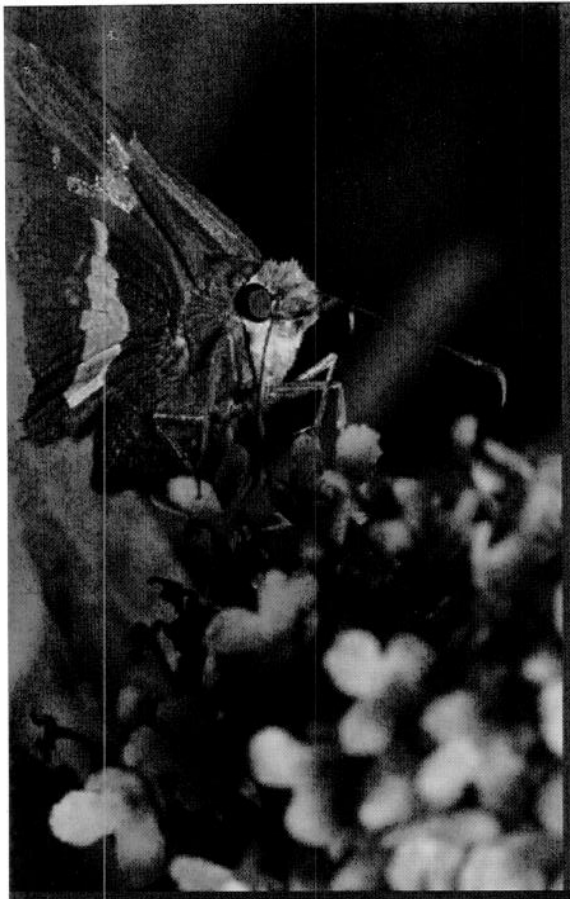
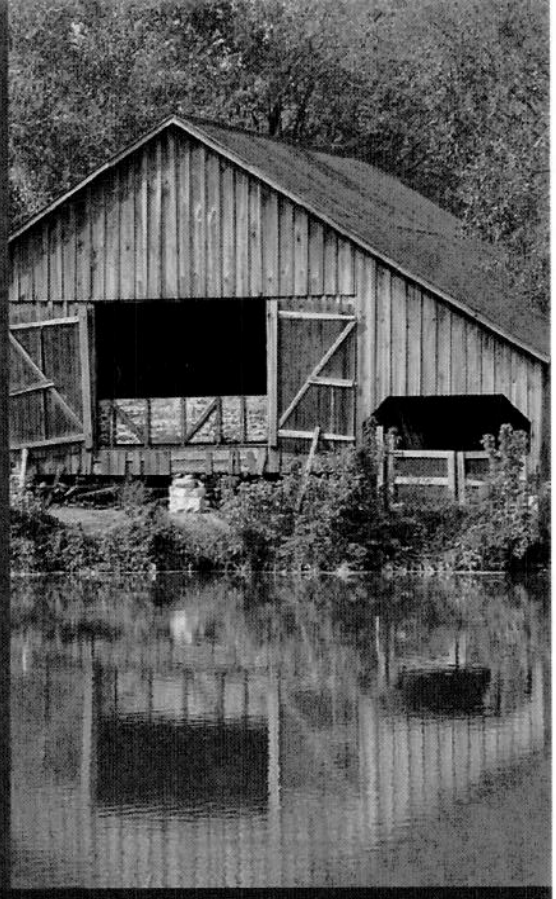
NAPPC

POLLINATOR PARTNERSHIP



SELECTING PLANTS FOR POLLINATORS



A REGIONAL GUIDE FOR FARMERS, LAND MANAGERS, AND GARDENERS IN THE

CENTRAL APPALACHIAN BROADLEAF FOREST

CONIFEROUS FOREST MEADOW PROVINCE

INCLUDING THE STATES OF:

MARYLAND, PENNSYLVANIA,

VIRGINIA, WEST VIRGINIA

AND PARTS OF:

GEORGIA, KENTUCKY,

NORTH CAROLINA,

SOUTH CAROLINA, TENNESSEE

POLLINATOR PARTNERSHIP

and

NAPPC

SELECTING PLANTS FOR POLLINATORS

A REGIONAL GUIDE FOR

FARMERS, LAND MANAGERS,

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ECOLOGICAL REGION OF THE

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GEORGIA, KENTUCKY,

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A NAPPC AND POLLINATOR PARTNERSHIP™ PUBLICATION

This guide was funded by the National Fish and Wildlife Foundation, the C.S. Fund, the Plant Conservation Alliance, the U.S. Forest Service, and the Bureau of Land Management with oversight by the Pollinator Partnership™ (www.pollinator.org), in support of the North American Pollinator Protection Campaign (NAPPC–www.nappc.org).

GETTING STARTED

THIS REGIONAL GUIDE IS just one in a series of plant selection tools designed to provide information on how individuals can influence pollinator populations through choices they make when they farm a plot of ground, manage large tracts of public land, or plant a garden. Each of us can have a positive impact by providing the essential habitat requirements for pollinators including food, water, shelter, and enough space to allow pollinators to raise their young.

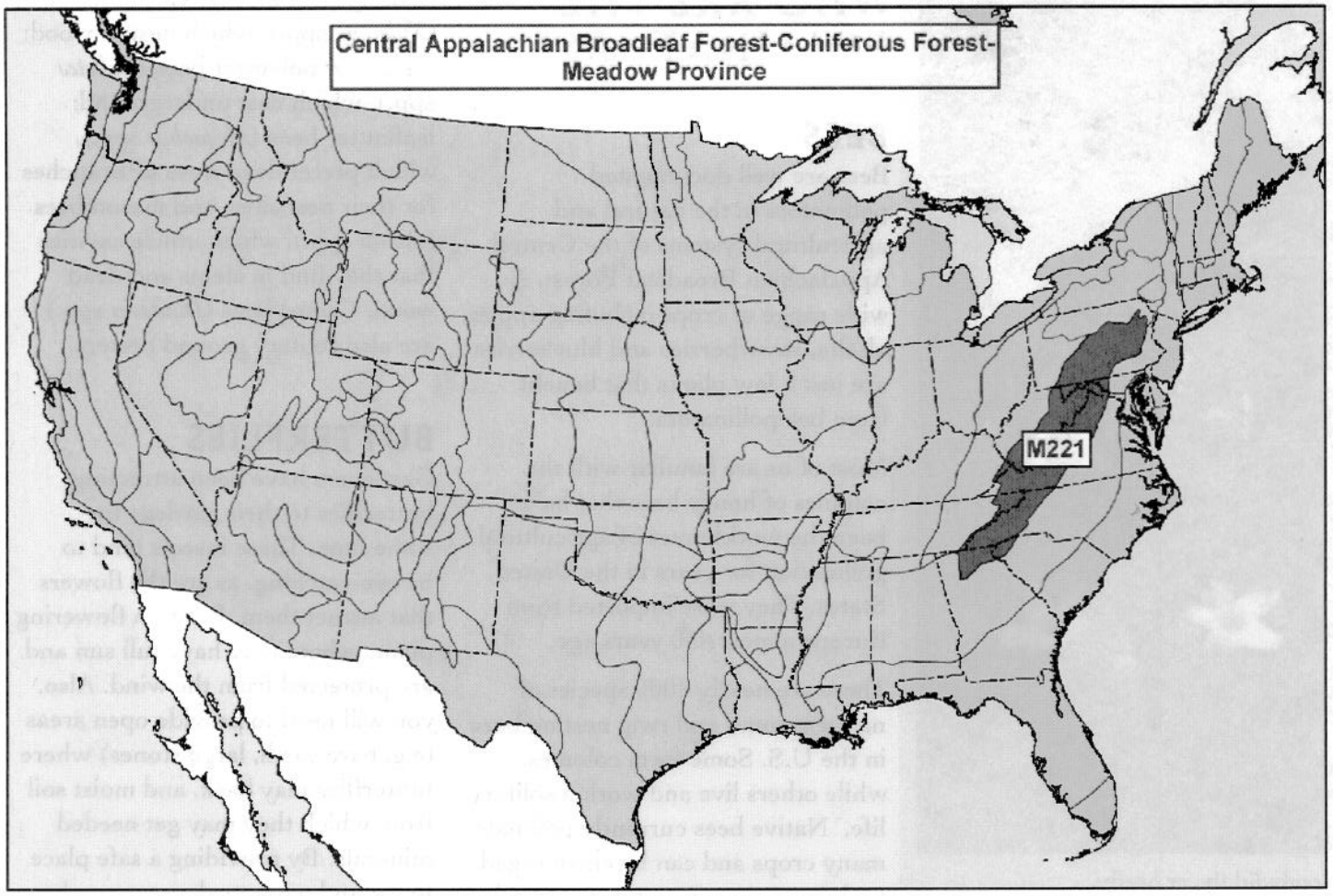
Pollinators travel through the landscape without regard to property ownership or state boundaries. We've chosen to use R.G. Bailey's classification system to identify the geographic focus of this guide and to underscore the connections between climate and vegetation types that affect the diversity of pollinators in the environment.

Bailey's Ecoregions of the United States, developed by the United States Forest Service, is a system created as a management tool and is used to predict responses to land management practices throughout large areas. This guide addresses pollinator-friendly land management practices in what is known as the Central Appalachian Broadleaf Forest, Coniferous Forest, Meadow Province.

Portions of nine states make up the 68,100 square miles of this forested, mountainous province. The topography is primarily composed of low mountains with greatly varied elevation, ranging from 300 to 6,000 feet. This province features a temperate climate with distinct winter and summer seasonal patterns, and all areas are subject to frost. Average annual temperatures are mild, ranging from 50° to 64°F. Average annual rainfall varies from 35 inches in the valleys to up to 80 inches on the highest peaks.

This province is characterized by vertical zonation. The southern Appalachian valleys feature a mixed oak-pine forest; above this zone lies the Appalachian oak forest, comprised of birch, beech, maple, elm, red oak, and basswood. Spruce-fir forests are also common on high peaks of the Allegheny and Great Smoky Mountains.

Long before there were homes and farms in this area, the original, natural vegetation provided continuous cover and adjacent feeding opportunities for wildlife, including pollinators. In choosing plants, aim to create habitat for pollinators that allow adequate food shelter, and water sources. Most pollinators have very small home ranges. You can make a difference by understanding the vegetation patterns of the farm, forest, or neighbor's yard adjacent to you and by making planting choices that support the pollinators' need for food and shelter as they move through the landscape.



The Central Appalachian Broadleaf Forest, Coniferous Forest, Meadow Province includes the states of:

Maryland, Pennsylvania, Virginia, West Virginia

And parts of:

Georgia, Kentucky, North Carolina, South Carolina, Tennessee

"ADDING NATIVE PLANTINGS IN RIPARIAN AREAS TO IMPROVE POLLINATOR HABITAT MAKES SENSE IN ADVANCING OUR FAMILY FARM'S CONSERVATION AND ECONOMIC OBJECTIVES, ENHANCING BENEFICIAL WILDLIFE AND IMPROVING POLLINATION IN OUR ORCHARD AND GARDEN."

--LEE MCDANIEL, FARMER AND PRESIDENT, NATIONAL ASSOCIATION OF CONSERVATION DISTRICTS

Forest are Brush-footed, Gossamer-winged, Swallowtail, Parnassian, Skipper, White, Sulphur and Milkweed butterflies. They usually look for flowers that provide a good landing platform.

Wet mud areas provide butterflies with both the moisture and minerals they need to stay healthy. Butterflies eat rotten fruit and even dung, so don't clean up all the messes in your garden!

MOTHS

Moths are most easily distinguished from butterflies by their antennae. Butterfly antennae are simple with a swelling at the end. Moth antennae differ from simple to featherlike, but never have a swelling at the tip. In addition, butterflies typically are active during the day; moths at night. Butterfly bodies are not very hairy, while moth bodies are quite hairy and more stout.

Moths, generally less colorful than butterflies, also play a role in pollination. They are attracted to flowers that are strongly sweet smelling, open in late afternoon or night, and are typically white or pale colored.

BEETLES

Over 30,000 species of beetles are found in the United States and many of them can be found on flower heads. Gardeners have yet to intentionally draw beetles to their gardens, possibly because beetle watching isn't as inspiring as butterfly or bird watching. Yet beetles do play a role in pollination. Some have a bad reputation because they can leave a mess behind, damaging plant parts that they eat. Beetles are not as efficient as some pollinators. They wander between different species, often dropping pollen as they go.

Beetle pollinated plants tend to be large, strong scented flowers with their sexual organs exposed. They are known to pollinate Magnolia, sweetshrub (*Calycanthus*), paw paws, and yellow pond lilies.

FLIES

It may be hard to imagine why one would want to attract flies to the garden. However, like beetles, the number of fly species and the fact that flies are generalist pollinators (visit many species of plants), should encourage us all to leave those flies alone and let them do their job as pollinators.

Recent research indicates that flies primarily pollinate small flowers that bloom under shade and in seasonally moist habitats. The National Research Council's *Status of Pollinators in North America* study states that flies are economically important as pollinators for a range of annual and bulbous ornamental flowers.

Plants pollinated by the fly include the American pawpaw (*Asimina triloba*), dead horse arum (*Helicodiceros muscivorus*), skunk cabbage (*Symplocarpus foetidus*), goldenrod (*Solidago* spp.), and members of the carrot family like Queen Anne's lace (*Daucus carota*).

BIRDS

Hummingbirds are the primary birds which play a role in pollination in North America. Their long beaks and tongues draw nectar from tubular flowers. Pollen is carried on both the beaks and feathers of different hummingbirds. The regions closer to the tropics, with warmer climates, boast the largest number of hummingbird species and the greatest number of native plants to support the bird's need for food. White-winged doves (*Zenaida asiatica*) are also pollinators of the saguaro cactus (*Carnegeia gigantea*) in the south central United States.

Bright colored tubular flowers attract hummingbirds to gardens throughout the United States. Hummingbirds can see the color red; bees cannot. Many tropical flowers, grown as annuals in the Central Appalachian Broadleaf Forest, along with native woodland edge plants, attract hummingbirds.

BATS

Though bats in the Central Appalachian Broadleaf Forest are not pollinators, bats play an important role in pollination in the southwest where they feed on agave and cactus. The long-nosed bats' head shape and long tongue allows it to delve into flower blossoms and extract both pollen and nectar.

AND THE POLLINATORS THEY ATTRACT

Pollinator				
Birds	Butterflies	Flies	Moths	Wind
Scarlet, orange, red or white	Bright, including red and purple	Pale and dull to dark brown or purple; flecked with translucent patches	Pale and dull red, purple, pink or white	Dull green, brown, or colorless; petals absent or reduced
Absent	Present	Absent	Absent	Absent
None	Faint but fresh	Putrid	Strong sweet; emitted at night	None
Ample; deeply hidden	Ample; deeply hidden	Usually absent	Ample; deeply hidden	None
Modest	Limited	Modest in amount	Limited	Abundant; small, smooth, and not sticky
Large funnel ike; cups, strong perch support	Narrow tube with spur; wide landing pad	Shallow; funnel like or complex and trap-like	Regular; tubular without a lip	Regular; small and stigmas exerted

http://www.fs.fed.us/wildflowers/pollinators/syndromes.shtml

FARMS

Alfalfa, blueberries, apples and strawberries are a few of the food crops in the Central Appalachian Broadleaf Forest Province that will benefit from strong native bee populations that boost pollination efficiency. Incorporate different plants throughout the farm that provide food for native populations when targeted crops are not in flower.

Farmers have many opportunities to incorporate pollinator-friendly land management practices on their land which will benefit the farmer in achieving his or her production goals:

- Manage the use of pesticides to reduce the impact on native pollinators. Spray when bees aren't active (just after dawn) and choose targeted ingredients.
- Carefully consider the use of herbicides. Perhaps the targeted weeds can provide needed food for pollinators.
- Minimize tillage to protect ground nesting pollinators.
- Ensure water sources are scattered throughout the landscape.
- Choose a variety of native plants to act as windbreaks, riparian buffers, and field borders throughout the farm.
- Plant unused areas of the farm with temporary cover crops that can provide food or with a variety of trees, shrubs, and flowers that provide both food and shelter for pollinators.
- Check with your local Natural Resources Conservation Service (NRCS) office to see what technical and financial support might be available to assist you in your effort to provide nectar, pollen, and larval food sources for pollinators on your farm.

Illustrations by Carolyn Vibbert

"FOOD SUPPLIES FOR BEES ARE CRITICAL TO MAINTAINING STRONG HIVES FOR ALMOND POLLINATION THE FOLLOWING WINTER."

-- DAN CUMMINGS, CHICO, CALIFORNIA ALMOND GROWER.

HOME LANDSCAPES

"A GARDEN IS ONLY AS RICH AND BEAUTIFUL AS THE INTEGRAL HEALTH OF THE SYSTEM; POLLINATORS ARE ESSENTIAL TO THE SYSTEM - MAKE YOUR HOME THEIR HOME."

-- DERRY MACBRIDE
NATIONAL AFFAIRS AND
LEGISLATION CHAIRWOMAN,
GARDEN CLUB OF AMERICA

Gardeners have a wide array of plants to use in their gardens. Native plants, plants introduced from years of plant exploration from around the world, and plants developed by professional and amateur breeders can be found in garden centers, in catalogs, and on web-sites. Use your knowledge of pollinator needs to guide your choices.

- Choose a variety of plants that will provide nectar and pollen throughout the growing season.
- Resist the urge to have a totally manicured lawn and garden. Leave bare ground for ground nesting bees. Leave areas of dead wood and leaf litter for other insects.
- Strive to eliminate the use of all pesticides.
- Find local resources to help you in your efforts. Contact your local county extension agent or native plant society. Visit your regional botanic gardens and arboreta.

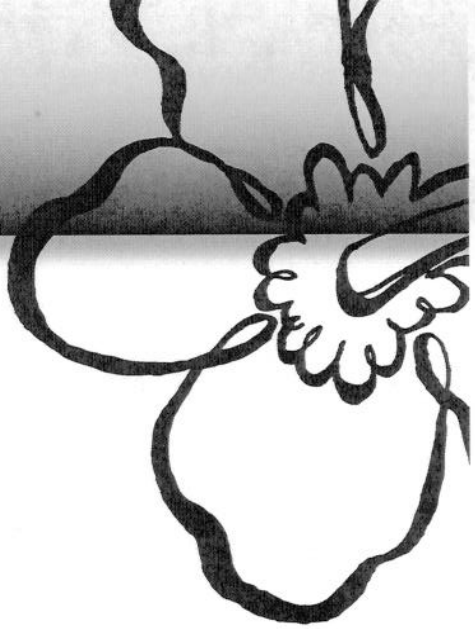
The scale of your plantings will vary but it is important to remember that you are trying to provide connectivity to the landscape adjacent to your property. Don't just look within your property boundaries. If your neighbor's property provides an essential element, such as water, which can be utilized by pollinators visiting your land, you may be able to devote more space to habitat elements that are missing nearby. It is best to use native plants which have evolved to support the needs of specific native pollinators. Some pollinators, however, are generalists and visit many different plants, both native and non-native. Be sure that any non-native plants you choose to use are not invasive. Remember that specialized cultivars sometimes aren't used by pollinators. Flowers that have been drastically altered, such as those that are double or a completely different color than the wild species, often prevent pollinators from finding and feeding on the flowers. In addition, some altered plants don't contain the same nectar and pollen resources that attract pollinators to the wild types.

- CAUTION: Take time to evaluate the source of your plant material. You want to ensure you get plants that are healthy and correctly identified. Your local native plant society can help you make informed decisions when searching for plants.

Botanical Name	Common Name	March	April	May	June	July	Aug	Sept	Oct	Nov
Dicentra eximia	Wild Bleeding Heart		rose-pink	rose-pink	rose-pink					
Diphylleia cymosa	Umbrella Leaf			white	white					
Eupatoriadelphus fistulosus	Hollow-stem Joe-pye-weed					lavender pink	lavender pink	lavender pink		
Eurybia divaricata	White Wood Aster						white with yellow center	white with yellow center	white with yellow center	
Galax urceolata	Galax			white	white	white				
Gentianella quinquefolia ssp. quinquefolia	Eastern Aqueweed						blue	blue	blue	
Geranium maculatum	Wild Geranium		pink to rose	pink to rose						
Helianthus atrorubens	Appalachian Sunflower					yellow with purple center	yellow with purple center	yellow with purple center		
Helianthus microcephalus	Small-headed Sunflower						yellow	yellow		
Heuchera villosa	Rock Alumroot					white	white			
Hexastylis shuttleworthii var. shuttleworthii	Large-flowered Heartleaf			brown	brown					
Iris cristata	Crested Iris		blue	blue						
Liatris scariosa var. scariosa	Northern Blazing-star						rosy-pink	rosy-pink		
Liatris spicata var. spicata	Dense Blazing-star					rosy-pink	rosy-pink	rosy-pink		
Lilium michauxi	Carolina Lily					orange-red with purple spots	orange-red with purple spots			
Lilium superbum	Turk's-cap Lily					orange to yellow	orange to yellow			
Lobelia cardinalis	Cardinal Flower					red	red	red		
Lobelia siphilitica	Great Blue Lobelia					blue	blue	blue		
Monarda didyma	Bee Balm					scarlet red	scarlet red	scarlet red		
Penstemon canescens	Appalachian Beardtongue			violet	violet					
Penstemon smallii	Blue Ridge Beardtongue			deep pink to purple	deep pink to purple					
Phemeranthus teretifolius	Appalachian Fameflower				pink	pink	pink	pink		
Phlox divaricata var. divaricata	Eastern Blue Phlox		blue	blue						
Phlox stolonifera	Creeping Phlox		blue	blue						
Rudbeckia laciniata	Green-headed Coneflower					yellow	yellow	yellow	yellow	
Rudbeckia triloba	Brown-eyed Susan					yellow	yellow	yellow		
Sanguinaria canadensis	Bloodroot	white	white							
Sedum glaucophyllum	Cliff Stonecrop			white	white					
Sedum telephoides	Appalachian Live-forever					pink	pink	pink		
Silene virginica	Fire Pink			red	red	red				
Solidago curtisii	Curtis's Goldenrod						yellow	yellow	yellow	
Solidago roanensis	Roan Mt. Goldenrod					yellow	yellow	yellow		
Symphyotrichum cordifolium	Blue Wood Aster							blue	blue	
Symphyotrichum undulatum	Wavy-leaved Aster						blue to lilac	blue to lilac	blue to lilac	blue to lilac
Thermopsis villosa	Aaron's-rod			yellow	yellow					
Tiarella cordifolia	Foamflower		white	white						
Trillium luteum	Yellow Trillium		yellow	yellow	yellow					
Vernonia noveboracensis	Ironweed						purple	purple		
Vines										
Aristolochia macrophylla	Dutchman's Pipe			brown	brown					
Clematis virginiana	Virgin's Bower					white	white	white		
Parthenocissus quinquefolia	Virginia Creeper				yellowish-green	yellowish-green				

Botanical Name	Common Name	Color	Height	Flower Season	Sun	Soil	Visitation by Pollinator	Also a host plant
Baptisia tinctoria	Yellow Wild indigo	yellow	2-3'	June-July	sun to partial shade	dry	butterflies, bees	X
Chelone lyoni	Appalachian Turtlehead	pink	24-48"	July-August	sun to partial shade	wet to moist	bees, butterflies, hummingbirds	X
Coreopsis pubescens var. pubescens	Hairy Coreopsis	golden-yellow	36-48"	July-Sept	sun to partial shade	dry to dry-mesic	butterflies, beetles, hummingbirds	
Dicentra eximia	Wild Bleeding Heart	rose-pink	12-18"	April-June	shade to partial shade	moist, well-drained, thin	hummingbirds, bees	
Diphylleia cymosa	Umbrella Leaf	white	18-30"	May-June	shade to partial shade	moist to wet	bees, beetles, flies	
Eupatoriadelphus fistulosus	Hollow-stem Joe-pye-weed	lavender pink	3-5'	July-Sept	sun to partial shade	moist to wet	bees, butterflies	X
Eurybia divaricata	White Wood Aster	white with yellow center	24-30"	August-Oct	shade to partial shade	moist	butterflies, bees	X
Galax urceolata	Galax	white	4-6"	May-July	shade to sun	moist to dry	bees, flies	
Gentianella quinquefolia ssp. quinquefolia	Eastern Aqueweed	blue	6-24"	August-Oct	sun to partial shade	dry to moist	bees, flies	
Geranium maculatum	Wild Geranium	pink to rose	18-24"	April-May	shade	moist	butterflies, bees	X
Helianthus atrorubens	Appalachian Sunflower	yellow with purple center	4-7'	July-Sept	sun to partial shade	dry	butterflies, bees	X
Helianthus microcephalus	Small-headed Sunflower	yellow	3-6'	August-Sept	shade to partial shade	moist to dry	bees, bees	X
Heuchera villosa	Rock Alumroot	white	8-24"	July-August	shade to partial shade	dry to moist, well drained thin soils, acidic	hummingbirds, butterflies	
Hexastylis shuttleworthii var. shuttleworthii	Large-flowered Heartleaf	brown	4-6"	May-June	shde	mesic, acidic	beetles, flies	
Iris cristata	Crested Iris	blue	6-10"	April-May	shade to partial shade	moist	hummingbirds, bees	
Liatris scariosa var. scariosa	Northern Blazing-star	rosy-pink	15-24'	August-Sept	sun	dry	butterflies, bees	
Liatris spicata var. spicata	Dense Blazing-star	rosy-pink	20-40'	July-Sept	sun	dry to wet	hummingbirds, butterflies, bees	
Lilium michauxi	Carolina Lily	orange-red with purple spots	30-40"	July-August	partial shade	dry	hummingbirds, butterflies	
Lilium superbum	Turk's-cap Lily	orange to yellow	to 8'	July-August	shade to partial shade	moist to wet	hummingbirds, moths, bees, butterflies	
Lobelia cardinalis	Cardinal Flower	red	36-48"	July-Sept	sun to partial shade	moist to wet	hummingbirds, butterflies, bees	
Lobelia siphilitica	Great Blue Lobelia	blue	24-40"	July-Sept	sun to partial shade	moist to wet	hummingbirds, bees, butterflies	
Monarda didyma	Bee Balm	scarlet red		July-September	sun to partial shade	moist to wet	hummingbirds, butterflies, bees	X
Penstemon canescens	Appalachian Beardtongue	violet	12-30"	May-June	sun to partial shade	dry to dry-mesic	hummingbirds, bees, butterflies	X
Penstemon smallii	Blue Ridge Beardtongue	deep pink to purple	12-24"	May-June	sun to partial shade	dry to dry-mesic	butterflies, bees, hummingbirds	X
Phemeranthus teretifolius	Appalachian Fameflower	pink	8-10"	June-Sept	sun	dry	butterflies	
Phlox divaricata var. divaricata	Eastern Blue Phlox	blue	12-15"	April-May	shade	moist	bees, butterflies	
Phlox stolonifera	Creeping Phlox	blue	6-8"	April-May	shade	moist	bees, butterflies	
Rudbeckia laciniata	Green-headed Coneflower	yellow	48-84"	July-October	sun to partial shade	moist to wet	bees, flies, wasps, butterflies, moths	X
Rudbeckia triloba	Brown-eyed Susan	yellow	24-42"	July-September	sun to partial shade	dry to moist	bees, flies, wasps, butterflies, moths, beetles	X
Sanguinaria canadensis	Bloodroot	white	6-12"	March-April	shade	moist	bees, beetles, flies	
Sedum glaucophyllum	Cliff Stonecrop	white	2-4"	May-June	partial shade	moist	butterflies	
Sedum telephoides	Appalachian Live-forever	pink	18"	July-Sept	sun	dry	butterflies	
Silene virginica	Fire Pink	red	8-12"	May-July	sun to partial shade	moist	hummingbirds, flies, bees, butterflies	
Solidago curtisii	Curtis's Goldenrod	yellow	1-2'	Aug-Oct	shade to partial shade	moist	butterflies, beetles, bees	X
Solidago roanensis	Roan Mt. Goldenrod	yellow	8-15"	July-Sept	sun	dry	butterflies, beetles, bees	X
Symphyotrichum cordifolium	Blue Wood Aster	blue	2-3'	Sept-Oct	shade to partial shade	moist	butterflies, bees, wasps, flies, beetles	X
Symphyotrichum undulatum	Wavy-leaved Aster	blue to lilac	3-4'	Aug-Nov	sun to partial shade	dry	butterflies, bees	X
Thermopsis villosa	Aaron's-rod	yellow	3-7'	May-June	sun to partial shade	dry to moist	butterflies	
Tiarella cordifolia	Foamflower	white		April-May	shade		butterflies, bees	
Trillium luteum	Yellow Trillium	yellow	4-12"	April-June	shade, higher calcium	moist	bees, beetles	X
Vernonia noveboracensis	Ironweed	purple	3-7'	August-Sept	sun to partial shade	moist to wet	butterflies, honeybees	X
				Vines				
Aristolochia macrophylla	Dutchman's Pipe	brown	15-30'	May-June	shade to partial shade	moist	flies	X
Clematis virginiana	Virgin's Bower	white	to 30'	July-Sept	sun to shade	moist	butterflies, bees, wasps	
Parthenocissus quinquefolia	Virginia Creeper	yellowish-green	30-45'	June-July	sun to partial shade	moist	bees	X

HABITAT AND NESTING REQUIREMENTS:



Bumble Bees:
Abandoned mouse nests, other rodent burrows, upside down flower pots, under boards, and other human-made cavities. Colonies are founded by a queen in the spring and don't die out in the fall. New queens mate then and overwinter in a sort of hibernation. Bumble bees are usually active during the morning hours and forage at colder temperatures than honey bees, even flying in light rain.

Large carpenter bees:
Soft dead wood, poplar, cottonwood or willow trunks and limbs, structural timbers including redwood. Depending on the species, there may be one or two brood cycles per year. These bees can be active all day even in the hottest weather.

Digger bees:
Sandy soil, compacted soils, bank sides. Anthophorid bees (now in the Apidae) are usually active in the morning hours, but can be seen at other times.

Small carpenter bees:
Pithy stems including roses and blackberry canes. These bees are more active in the morning but can be found at other times.

Squash and Gourd bees:
Sandy soil, may nest in gardens (where pumpkins, squash and gourds are grown) or pathways. These bees are early risers and can be found in pumpkin patches before dawn. Males often sleep in the wilted flowers.

Leafcutter bees:
Pre-existing circular tunnels of various diameters in dead but sound wood created by emerging beetles, some nest in the ground. Leave dead limbs and trees to support not just pollinators but other wildlife. Leafcutter bees can be seen foraging throughout the day even in hot weather.

Mason bees:
Pre-existing tunnels, various diameters in dead wood made by emerging beetles, or human-made nesting substrates, drilled wood boards, paper soda straws inserted into cans attached to buildings. Mason bees are generally more active in the morning hours.

Sweat bees:
Bare ground, compacted soil, sunny areas not covered by vegetation. Like most bees, sweat bees forage for pollen earlier in the morning and then for nectar later.

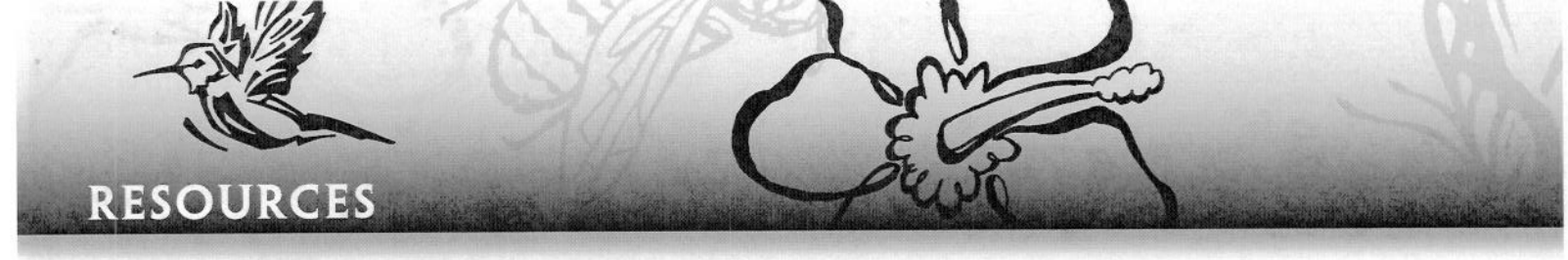
Plasterer or cellophane bees:
Bare ground, banks or cliffs. Colletid bees can be active in the morning or later in the day.

Yellow-faced bees:
In dead stems. These bees are more active during morning hours.

Andrenid bees:
Sunny, bare ground, sand soil, under leaf litter or in soil in banksides and cliffs. These generally spring-active bees are most commonly seen on flowers during the morning when pollen and nectar resources are abundant.

"MONARCH BUTTERFLIES NEVER FAIL TO CATCH THE VISITOR'S EYE AND ALWAYS LEAD TO A TEACHABLE MOMENT."

-- LOGAN LEE,
PRAIRIE SUPERVISOR
MIDEWIN NATIONAL
TALLGRASS PRAIRIE



RESOURCES

Many books, websites, and people were consulted to gather information for this guide. Use this list as a starting point to learn more about pollinators and plants in your area.

BAILEY'S ECOREGION MAPS

USDA Forest Service
http://www.fs.fed.us/land/ecosysmgmt/ecoreg1_home.html

POLLINATION/POLLINATORS

Pollinator Partnership
www.pollinator.org

Coevolution Institute
www.coevolution.org

Natural Resources Conservation Service
www.nrcs.usda.gov

North American Pollinator Protection Campaign
www.nappc.org

USDA Forest Service
www.fs.fed.us/wildflowers/pollinators/

Wild Farm Alliance
www.wildfarmalliance.org

The Xerces Society
www.xerces.org

Illinois Natural History Survey
www.inhs.uiuc.edu

Buchmann, S.L. and G.P. Nabhan. 1997. *The Forgotten Pollinators* Island Press: Washington, DC.

Committee on the Status of Pollinators in North America. 2007. *Status of Pollinators in North America* The National Academies Press: Washington, DC.

NATIVE PLANTS

Plant Conservation Alliance
www.nps.gov/plants

Seeds of Success
www.nps.gov/plants/sos

Lady Bird Johnson Wildflower Center
www.wildflower.org/plants/

USDA Hardiness Zone Map
www.usna.usda/Hardzone/

U.S. National Arboretum
www.usna.usda.gov/Hardzone/ushzmap.html

USDA, NRCS. 2007. The PLANTS Database www.plants.usda.gov, 19 July, 2007 National Plant Data Center, Baton Rouge, LA 70874-4490 USA

NATIVE BEES

National Sustainable Information Service
"Alternative Pollinators: Native Bees" by Lane Greer, NCAT Agriculture Specialist, Published 1999, ATTRA Publication #IP126
www.attra.ncat.org/attra-pub/nativebee.html

Agriculture Research Service
Plants Attractive to Native Bees table
www.ars.usda.gov/Research/docs.htm?docid=12052

BUTTERFLIES AND MOTHS

Opler, Paul A., Harry Pavulaan, Ray E. Stanford, Michael Pogue, coordinators. 2006. Butterflies and Moths of North America. Bozeman, MT: NBII Mountain Prairie Information Node. www.butterfliesandmoths.org/ (Version 07192007)

Pyle, Robert Michael. 1981. National Audubon Society Field Guide to Butterflies. Alfred A. Knopf: New York, NY.

North American Buterfly Association
www.naba.org

FEEDBACK

We need your help to create better guides for other parts of North America. Please e-mail your input to **feedback@pollinator.org** or fax to **415-362-3070**.

- How will you use this guide?
- Do you find the directions clear? If not, please tell us what is unclear.
- Is there any information you feel is missing from the guide?
- Any other comments?

THANK YOU FOR TAKING THE TIME TO HELP!

NAPPC Honeybee Health Task Force [1]

Current Research Projects

- **Effects of miticide and Fumagilin-B® on honey bee survivorship and immune responses**
  Catherine M Little, M.Sc. candidate, Acadia University

Western honey bees (*Apis mellifera*) are exposed to a number of parasites. *Varroa destructor*, *Nosema apis*, and *N. ceranae* have particularly detrimental effects on colony productivity and survival. We will measure honey bee immune responses to infection by each of these three species of parasites and the effects of co-infection. We will then compare the results of infection with the effects of miticide and Fumagilin-B® use on honey bee physiology. Quantification of immune trade-offs which occur during infection by multiple parasites and the effects of standard chemical treatments may enable us to determine infection threshold levels for effective use of chemical treatments, thereby reducing the risk of chemical resistance developing in either *Varroa* or *Nosema*We will also determine if immune protein concentrations resulting from parasitic infection are predictive of honey bee survival, potentially leading to a means of assessing mortality risk during preparations for over-wintering honey bee colonies.

- **Assessment of Sublethal Effects of Imidacloprid on Honey Bee and Colony Health.**
  Galen P. Dively and Mike Embrey, Department of Entomology, University of Maryland

While the extent and causes of CCD are unknown, many believe that honey bees have reached a tipping point wherein the colony can no longer protect itself from a barrage of problems. The CCD Working Group developed an action plan of research that addresses four categories of factors that impact bee and colony health: 1) new or re-emerging pathogens; 2) bee pests; 3) environmental and nutritional stresses; and 4) pesticides. This project will address the latter category and examine the sublethal effects of pesticides, which is one of the priority areas identified by the HBHI Task Force for funding.

- **Nutritional Effects on Intestinal Health and Longevity of Honey bee Workers**
  Olav Rueppell, Dept. of Biology, University of North Carolina at Greensboro

This research project seeks to identify the effects of diet quality and malnutrition on the health of the honey bee worker intestine, as assessed by the activity of their intestinal stem cells. The intestinal epithelium is crucial to organismal health and it is one of the most exposed tissues in the animal body. Its cells are continuously replaced in a wide variety of organisms (Finch and Kirkwood 2000). Although early reports on proliferative cells in the intestine of insects exist (Snodgrass 1956), these cells have only recently been characterized as bona-fide stem cells in adults through molecular analyses in *Drosophila* (Micchelli and Perrimon 2006; Ohlstein and Spradling 2006). A certain level of cell proliferation is necessary to maintain a functional intestine, even in the adult insect. Thus, the activity of these cells has been linked to insect

[1] http://www.pollinator.org/honeybee_health.htm.

response to viral infection. If we are correct, then the results of the flow cytometry experiments could be used (in the place of more time consuming and expensive field trials) to quickly assess the presence or absence of viral resistance in aid of breeding programs to develop or propagate virus resistant honey bees.

Perhaps more importantly, flow cytometry should reveal whether differential immune responses correlate with virus resistant phenotypes, offering clues to some mechanisms of viral resistance.

- **Changes in hormonal and protein levels in honey bees that are experiencing migratory transportation.** Zachary Huang, Department of Entomology, Michigan State University

Aside from pesticides, perhaps the strongest stress honey bees experience comes from long distance transportation, commonly used for pollination purposes. For example, bees can transported from Maine to California, across four different time zones. No studies have ever been conducted to determine the physiological or behavioral changes induced by such stress. In this study, I propose to piggyback with Dr. Jeff Pettis's group to obtain data on physiological changes in honey bees that are experiencing migratory transportation. The objectives of this study is to 1) measure changes in juvenile hormones in bees that are being transported from Florida to California, and 2) determine the protein nutrition of the same bees. Proper control will be obtained from bees which are staying in Florida. *Update 5/19/08*: We are currently measuring the hormone levels in groups of bees in Bakersfield, CA and Boston, GA. We still have to thaw the bees and bleed them for the CA samples. We might do a third trial if we see something interesting.

Honeybee Health Improvement Task Force Members

- Laurie Davies Adams, Pollinator Partnership/NAPPC
- May Berenbaum, University of Illinois
- Nicholas Calderone, Cornell University
- Dewey Caron, University of Delaware
- Christine Elsik Georgetown University
- Wayne Esaias, Oceanographer
- Diana Cox Foster, Penn State University
- Christina Grozinger, North Carolina State University (Co-Chair)
- G. W. (Jerry) Hayes, Apiary Inspectors of America
- Douglas Holy, USDA, Natural Resources Conservation Service
- Eric Mussen, University of California-Davis
- Jeff Pettis, Research Leader, USDA-ARS Bee Research Lab
- Gene Robinson, University of Illinois
- Colin Stewart, USDA APHIS PPQ
- Barry H. Thompson, Thompson Apiaries, LLC (Co-Chair)
- Daniel Weaver, Bee Weaver Apiaries, Inc. (Co-Chair)
- Wayne Wehling, USDA APHIS PPQ

Committee on Agriculture
U.S. House of Representatives
Required Witness Disclosure Form

House Rules* require nongovernmental witnesses to disclose the amount and source of Federal grants received since October 1, 2004.

Name: **Laurie Davies Adams**

Address: **423 Washington, 5th Floor,**
San Francisco, CA 94111

Telephone: **415-362-1137**

Organization you represent (if any):
Pollinator Partnership - DBA for the 501 (c) 3 Coevolution Institute

1. **Please list any federal grants or contracts (including subgrants and subcontracts) you have received since October 1, 2004, as well as the source and the amount of each grant or contract. House Rules do NOT require disclosure of federal payments to individuals, such as Social Security or Medicare benefits, farm program payments, or assistance to agricultural producers:**

Source: N/A _____ **Amount:** _____

Source: _____ **Amount:** _____

2. **If you are appearing on behalf of an organization, please list any federal grants or contracts (including subgrants and subcontracts) the organization has received since October 1, 2004, as well as the source and the amount of each grant or contract:**

Source: Department of Defense Legacy **Amount: $100,000**

Source: USDA NRCS Conservation Innovation Grant **Amount: $75,000**

Please check here if this form is NOT applicable to you: _____

Signature: Laurie Davies Adams

* Rule XI, clause 2(g)(4) of the U.S. House of Representatives provides: *Each committee shall, to the greatest extent practicable, require witnesses who appear before it to submit in advance written statements of proposed testimony and to limit their initial presentations to the committee to brief summaries thereof. In the case of a witness appearing in a nongovernmental capacity, a written statement of proposed testimony shall include a curriculum vitae and a disclosure of the amount and source (by agency and program) of each Federal grant (or subgrant thereof) or contract (or subcontract thereof) received during the current fiscal year or either of the two previous fiscal years by the witness or by any entity represented by the witness.*

PLEASE ATTACH DISCLOSURE FORM TO EACH COPY OF TESTIMONY.