GLEANINGS IN MAR. '89

BEE CULTURE

INSIDE:

- Collecting Pollen
- Pollination Basics
- Package Primer

PLUS . . .

- Beauty & The Bees
- Roger Welsch
- Tracheal Mite Update
- Varroa Advances

FUTURE FOOD?

MARCH '89 CONTENTS

(ISSN 0017-114X) Vol. 117, No. 3
116 Years Continuous Publication by the Same Organization

Features

Articles

Columns

Departments

NEXT MONTH

April. Those showers bring more than flowers next month, so don't be *foolish* and miss this issue.

First, our annual directory — the WHO'S WHO IN APICULTURE appears next month. The most important listing published used by every, and anyone who wants to know more about our industry. A keeper for sure.

But there's more! The First Inspection is the final part of our Package Primer series. We've taken you this far, wait just a bit and we'll give you a good look at what to look for.

James Tew has a great article on Commercial beekeeping next month, which is only the first of several.

And speaking of Commercial beekeeping, over the next few months we'll have barrels and barrels of articles on that subject:

- A several part profile of the largest beekeeping operation in Oregon
- Honey house design for sideline and commercial outfits
- Large scale queen rearing (and fall requeening)
- The kinds of equipment designed for commercial use (but everyone will learn something from this one!)
- Profiles of migratory honey producers and pollinators

But we haven't neglected the sideliners and hobbyists out there! We've got a lot to offer here, too:

- How-to harvest for the hobbyist
- Small scale honey extracting
- Queen introduction
- Using eight frame equipment
- Honey tasting
- More Southeast Exposure
- More Beauty and the Bees
- Crop Competitors — not beekeepers or bees, but the little (and sometimes big) things that make life miserable for foragers

And that's just a taste of what's to come. The greatest lineup of stories, articles, how-to's and when-to's you can imagine.

Next month — WHO'S WHO, Package Primer, a few surprises, plus the best collection of Columnists in the business. In April. In *Bee Culture*. Δ

CLIC TRADING INC.

WE BUY BEESWAX
(crude and unadulterated)
AND BUCKWHEAT HONEY
in lots of minimum 10,000 lbs.

Call WAYNE or ELYSE at (514) 669-2663

2025 Fortin Blvd., Chomedey, Laval, Québec, Canada H7S 1P4

M. C. BERRY & SON
"OLD RELIABLE" PACKAGE BEES AND QUEENS

Area Code 205 — Office 281-0812 — Home 281-5140 (24 hrs.)
P. O. Box 684 • MONTGOMERY, ALABAMA 36101
H. ELLIOTT ALLEN, III, Owner

1989 PRICE LIST

Parcel Post Package Bees & Queens

In Lots of	Queens	2-Pound & Queen	3-Pound & Queen	4-Pound & Queen	5-Pound & Queen
1-24 . .	$6.50	$25.75	$31.50	$37.00	$42.75
25-99 .	$6.20	$23.75	$29.25	$35.00	$40.75
100 & up	$5.90	$22.50	$28.25	$34.00	$39.75

WRITE FOR PRICES ON PACKAGES 100 AND UP
PRICES INCLUDE POSTAGE, SPECIAL HANDLING, AND INSURANCE FEES.
If Shipment arrives in poor condition, place Claim immediately with Post Office for damages.
Packages can only be shipped parcel post.
To book parcel post orders, check or money order must accompany order.
Prices are subject to change.
We may run late on shipping, but will come as near to your desired shipping date as possible.
Tested Queens are available at $2.00 extra. Marking and/or clipping of queens is 50¢ extra per queen.

Packages and Queens to be Picked up at Montgomery, Alabama

In Lots of	Queens	2-Pound & Queen	3-Pound & Queen	4-Pound & Queen	5-Pound & Queen
1-24 .	$6.50	$19.50	$25.50	$31.50	$35.00
25-99 .	$6.20	$18.75	$24.50	$30.50	$34.75
100 & up .	$5.90	$18.00	$23.50	$29.25	$33.50

ADDRESS CHANGE

If you are moving, please fill in the form below so we can process the change without undue delay. Also, if you have 2 addresses during the year (i.e., winters in Florida and summers in Connecticut), let us know which months you spend where and we can pre-program your address change so you will find us waiting when you move — No Delays, No Fuss!

FOR PERMANENT CHANGE:
Name _____
Old Address: Street _____
City: _____ State _____ Zip _____

New Address: Street _____
City: _____ State _____ Zip _____

FOR TEMPORARY CHANGE:
Name _____
Address No. 1: Street _____
City: _____ State _____ Zip _____
Circle Appropriate Months: J F M A M J J A S O N D

Address No. 2: Street _____
City: _____ State _____ Zip _____
Circle Appropriate Months: J F M A M J J A S O N D
Send to: The A. I. Root Co., Subscription Department, P. O. Box 706, Mediina, OH 44258

THE A.I. ROOT CO., Publishers
623 W. LIBERTY STREET
MEDINA, OHIO 44256

Copyright © 1989 by The A. I. Root Co.
All rights reserved.

John Root	*Publisher*
Kim Flottum	*Editor*
Cynthia Stephens	*Production Coordinator*
Susan Steppenbacker	*Photo Supervisor*
Rebecca Dull	*Subscription Manager*
Linda Pringle	*Advertising Manager*
Buzz Phillips	*Circulation Director*
Diana Sammataro	*Equipment Editor*

Contributing Editors:
C. Collison, G. Gibson, A. Harman, E. Jaycox, R. Morse, S. Taber, R. Taylor, J. Tew, C. Mraz and C. Koover

Subscription Rates: United States, one year, $12.95; two years, $25.00. **Newsstand Price: $1.95.** Other countries including Canada, Pan American countries and Spain (U.S. Currency only), $7.50 per year additional for postage. Remittance should be sent by post office money order, bank draft, express money order or check. Published monthly. Discontinuance: Subscription stopped on expiration. Change of Address: Fill out and return form contained inside issue. Articles are solicited. Stamps should be enclosed to insure return of manuscript to author if not printed. *Opinions expressed by the writers in these columns are not necessarily those of the editors.* Advertising rates and conditions will be sent on request. Advertisers' Reliability: While the publishers do not guarantee advertisements in this journal, over the years very few complaints have been received. Microfilm copies available at: University Microfilms, Inc., 300 North Zeeb Road, Ann Arbor, Michigan 48103. Second Class Postage Paid at Medina, Ohio and additional offices.

POSTMASTER: Send Form 3579 to:
623 West Liberty Street • P.O. Box 706
Medina, Ohio 44258-0706
Phone: (216) 725-6677

THE INNER COVER

Dominoes

Remember the Domino Theory of Southeast Asia a few years back? The feeling was that if one of the local countries there was forced to adopt a different style of government, it's neighbors would soon fall too. Like a row of dominoes standing on end, once the first was tipped, the rest would follow — gravity is seldom compromised.

American agriculture has its own domino theory. But rather than a row, these dominoes are in a circle, each affected by, and affecting its neighbor. Circles have neither beginning nor end, so any tipped is the first — and gravity still has her way. In Southeast Asia the players were countries, but here they're segments of U.S. agriculture seed production, planting, growing, harvesting, sales and consumption.

Seed production is an interesting segment. Plants are grown for the express purpose of producing seed. To get there, land must be prepared and planted (tractors, implements); fertilizer applied (implements, fertilizer); plants must be protected (agrichemicals); pollination must occur (honey bees and beekeepers); moisture applied (irrigation equipment); harvesting (implements, storage facilities); and finally packaging for sale. I haven't mentioned the manpower required, the taxes or insurance paid or other hidden costs. Agriculture is a very large circle, with many smaller circles within.

Pollination is one such circle. To make the marriage of bee and blossom takes the efforts of beekeepers, colony brokers, truck drivers, state inspection services, crop growers, and more. If any of these is threatened, if the domino is tipped, the rest will fall as surely as water over Niagara.

Threats? No beekeepers (pests destroy colonies, import competition, excessive travel restrictions); no colony brokers (not enough colonies to move); truck drivers (inter- and intra-state movement restrictions); state inspection services (reduced funding, user abuse); no growers (unable to get bees to pollinate).

Like I said, agriculture is a circle, each segment a domino, each able to hinder, or help the rest. *Kim Flottum*

COVER . . . The Feature article this month deals with the business of pollination in the U.S. It talks about the number of colonies involved, the crops they are used on, and the growth trends over several years for both. It is clear that commercial pollination services and some aspects of agriculture are mutually dependant.

So why Future Food?

If, as hinted in the article, the people responsible for maintaining those colonies of honey bees were no longer able to do so, agriculture in this country would change. Let's look at a few facts:

- Of the approximately 250 million acres cultivated in the U.S., just over 60% are planted to wind or self-pollinated crops (corn, small grains).
- Slightly more than 20% are planted to crops not requiring, but definitely benefiting from honey bee pollination (soybeans, cotton, beans).
- Nearly 13% are planted to hay crops, strongly aided by insect pollination, for seed production (alfalfa, clovers).
- Only 3% of U.S. farm land is planted to fruits, vegetable and nut crops absolutely dependant on honey bee pollination.

That 3% makes up 15% of our daily diet. The cattle and other meat (dairy) sources that consume hay crops produce still another 15% of what we eat. Finally, 3% of our diet is in the form of fats and oils derived from honey bee pollinated plants. Altogether, these total fully one third of our daily intake.

But this is atypical in the global sense, as only eleven plant species supply 90% of the world's food supply. These are rice, wheat, maize, sorghum, millet, rye, barley, potatoes, cassava, bananas, and coconuts. Rice alone makes up two thirds of this total, and rice is certainly *not* dependant on honey bees.

Future Food? Without the business of commercial pollination in this country, our diet will change, our agriculture will change, and there will be far fewer of the things we enjoy eating.

Think carefully about this. The saying "As American as Apple Pie" may one day be "As Perfect as Rice Pudding". Δ

MAILBOX

Carr's Migratory Bottom Board

N. Carr solved the problem of moving hives by using a bottom board constructed on the principle of a "bee escape" in reverse. He put them on in place of the regular bottom boards, but it might be possible to modify the design for use as an insert? It permits moving bees during daylight hours without leaving masses of field bees behind, and is ideal when there is short (or no) notice of pesticide spraying. Most of the bees were in after an hour's time with very few strays left.

Carr's board would be useful to trap bees in walls and other inaccessible places where they are creating a nuisance, and must be removed and destroyed quickly; as might be the case where an Africanized swarm has settled.

Drawings and instructions were published in *The Australasian Beekeeper* 64 (9): 206 (1963) and I will send a copy for $1.00 and a self-addressed envelope.

Toge Johanson
R.D. 1 Box 256A
East Berne, NY 12059

Wear Warning

I'm writing to caution readers to be wary of a company called **BEES**, Box 2783, Providence, RI 02907 who used to advertise bee jewelry in the journals.

On March 8, 1988 I placed an order for one (1) dozen bee bolo ties, and included a check for $35.00. It was deposited by **BEES** on March 18, 1988 in Citizens Trust Company, Providence, Rhode Island.

Despite my repeated communications with BEES, the State Attorney General's Office of Consumer Protection, and the Providence Consumers' Council, I have yet to receive the merchandise or a refund.

As Caesar would proclaim, "Caveat emptor" — let the buyer beeware!

John Iannuzzi
Howard Fruit Farms RD8
9772 Old Annapolis Rd.
Ellicott City, MD 21043

Continued on Page 136

NORTHERN CALIFORNIA

Queens & Packages

ITALIANS and CARNIOLANS

C. F. KOEHNEN & SONS, INC.

Rt. 1, Box 240 • Glenn, California 95943
(916) 891-5216 or (916) 934-5216

VISA MasterCard

Quality and Service Since 1907 • Immediate Shipment

NETTED TARPS

EXCELLENT MESH SPACING FOR MAXIMUM VENTILATION

Cargo Straps • Rope • Rubber Snubbers

We ship **ALL** States
Truck • U.P.S.

Vinyl Tarps, Chain Binders, etc., plus much, much more!

Home Corporate Office:
4707 Cloutier Dr. • P. O. Box 1087
Salida, CA 95368
(209) 545-1607 or 1-800-553-4222 (Nr. Cal. Only)

Northwest-Division
6779 Crater Lake Hwy. 62
Central Point, OR
(503) 826-7717 or 1-800-638-TARP

CERTIFIED MITE FREE **HOMAN'S** WE FEED FUMIDIL-B

Quality Bred Caucasian & Italian Bees & Queens

• PACKAGES:	2 lb. w/queen:	1 - 9	$22.50	10 - up	$21.50
	3 lb. w/queen:	1 - 9	$27.50	10 - up	$26.50
• QUEENS:		1-49	$5.50	50-up	$5.00
• TRUCKS:	2 lb. w/queen	$16.00		3 lb. w/queen	$20.00

Prices include postage, special handling and insurance. Health Certificate furnished.

HOLDER HOMAN APIARIES

Rt. 2, Box 123-B • Shannon, MS 38868 • (601) 767-3880

We have available Extracting Equipment for the Commercial Honey Producer.

For information write to:

Cook & Beals, Inc.
Loup City, NE 68853
Phone: (308) 745-0154

Pollen Substitute

EXPELLER PROCESSED SOY FLOUR & BREWERS YEAST

** Proven superior for brood production.
** Contains necessary protein, fats & vitamins for growing larvae.
** Mix 3 parts Expeller Soy Flour to 1 part Brewers Yeast.

10 lb. bag Expeller Soy Flour	$ 6.50
50 lb. bag Expeller Soy Flour	24.65
1 lb. bag Brewers Yeast	1.15
50 lb. bag Brewers Yeast	26.90

All prices are FOB Hackensack, MN

For our FREE fact sheet & feeding tips Write:

Mann Lake Supply

County Road 40 & First Street • Hackensack, MN 56452
Order toll FREE: 1-800-233-6663

MAILBOX

Venom Vender?

In a previous issue there was an article on the use of Bee Venom for the relief of certain ailments. Well, I can vouch for the good use of it.

I am a beekeeper, and have been troubled with arthritis. As long as I was serving as local bee inspector I received enough stings to keep my arthritis under control, but a year ago I gave up the position. Now, since I no longer receive stings on a regular basis, my arthritis has become worse. It is very uncomfortable now, and getting worse.

I am now looking for anyone that could help me locate a source of venom for year round use. I would be grateful for any information.

Harvey Hartzler
1645 Lincoln Hwy.
Bucyrus, OH 44820

Glad Giver

You published my letter wishing to donate my 20 year collection of *Gleanings* in the January issue.

Never in my wildest dreams did I expect such a response. Letters and phone calls came from Alaska, Canada, many states and even Germany. Such nice people, and each call had a valid reason for wanting the magazines.

The decision where to place these was difficult, but the collection has been donated to Texas A & M University, Dept. of Entomology. As a retired beekeeper and school teacher, I felt more people could benefit by donating to the university.

Continued on Next Page

Silverbow's
Complete Line of Beekeeping Supplies

Send for our free Catalog

Silverbow Honey Co. Inc.
P.O. Box 219, 1220 13th St.
Snohomish, WA 98290
Phone: (206) 568-2191

MAILBOX

Thanks to all of you for your response. I wish I could have shared with all of you.

Alex Catania
Covina, CA

Shockingly Simple!!!

I remember reading that someone asked how to remove wire from frames that were producing chunk honey.

I used to produce chunk honey and always wired the frames. I taped an insulated wire to the handle of a pair of pliers. Then I fastened this wire to one post of a battery and another piece of wire to the other post. I snipped the wire between the holes on the outside of the end bar and pulled the tacks from the other ends.

I then grasped the wire where the tacks were with the pliers and touched the cut end with the other wire from the battery. It will get very hot, but then pull the wire through the honey with the pliers. The hot wire will seal the hole and you have perfect comb to cut.

It is a good idea to have insulation on your plier handles.

John Bruce

Winter Wax

A tip to anyone who has, uses or knows someone with a toboggan. Beeswax on the bottom helps protect the wood, and makes sliding more enjoyable. A good way to sell wax, too. Plan now for next fall sales.

Gary Jolly
Taylor, MI

Three Banded Italian Package Bees and Queens
Booking Orders for 1989.
Our queens are bred to produce LARGE colonies as well as large amounts of honey.

	Queens	2 lb. w/Queen	3 lb. w/Queen
1 - 4	$6.00	$20.50	$25.50
5 - 24	$5.75	$20.25	$25.00
25 - 49	$5.50	$19.25	$24.25
50 - up	$5.25	$18.75	$23.75

This price includes postage and insurance. Prices start April 1, 1989. Mite free and health certificates furnished with all shipments. Fumidil-B fed to all package colonies and queen nuclei. For all parcel post orders paid in full by Feb. 1, deduct $1.00 per package.

Write or call for prices on packages picked up at my apiary and delivered.

K & K HONEY BEE FARM
Rt. 1, Box 166A • Dept. G. • Millry, ALA 36558
After 5 p.m. Phone (205) 846-2934

BES❀WICWAS
Book and Slide Publisher for the Beekeeping Industry

S.E. McGregor: **Insect Pollination of Cultivated Crop Plants** — The *classic* reference — $18.95

Ted Hooper and Mike Taylor: NEW! **The Beekeeper's Garden** — plants visited by honeybees — $20.95

Rex Sawyer: **Honey Identification** NEW! Use pollen analysis to identify honey sources — $30.00

H. Storch: **At the Hive Entrance** — Observations at the side of the hive — $12.95

Leslie Real: **Pollination Biology** — $31.50

Croft: **Allergy to Bee Stings and its prevention** — NEW! — $28.00

Larry Connor: **Pollination** (20 Slide Set) Shows common crop pollination needs — notes — $20.00 • **How Flowers Attract Bees** (20 Slide Set) — notes — $20.00

Robert Suter: **Pollination Ecology** (20 Slide Set) — Results of coevolution of insects and flowers —notes — $39.50

Collison: **Feeding Honey Bee Colonies** (42 Slide Set) How To Feed — notes — $45.00

Prices include postage within the USA

L Connor, Owner, PO Box 817G, Cheshire, Connecticut, 06410 Phone 203 271-0155

Plantation Bee Company

P. O. Box 777
Baxley, GA 31513
(912) 367-2984

ITALIAN QUEENS
Prices Include Postage

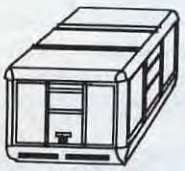
No. of Queens	Thru May 14	After May 15
1 5	$5.50	$3.90
6 24	$5.25	$3.75
25 99	$5.00	$3.50
100 up	$4.75	$3.25

PACKAGE BEES
Shipped F.O.B. Baxley, GA
Shipped with queen

	1 - 10	11 - 99	100 - up
2 lb.	$18.75	$18.25	$17.75
3 lb.	$22.75	$22.75	$21.75

• Menthol and Fumidil-B treated hives • Apistan Queen Tabs and Apistan Package Bee Strips available • Disease and mite free certified • Custom breeding available •
TERMS: Orders of $100.00 or more, 10% deposit, balance due two weeks before shipment. Others, cash with order. MasterCard, Visa customers include card number and expiration.

PLASTIC HIVES
$55.00
Includes: plastic frames or frame/foundation units, top, bottom & deep body
ADD $10 for wired wax foundation
Ready to use on arrival! Standard 10 Frame



WRITE FOR DETAILS

THE PLASTIC WAY
P. O. Box 65, Dept. G
Moorestown, NJ 08057
Phone: (689) 235-6454

$8.00 SHIPPING & HANDLING • ($12.00 WEST OF THE MISSISSIPPI)

Great Ideas!

MAXANT INDUSTRIES

Maxant Industries announce a new product! A fully motorized automatic chain uncapper — the *Diamond-5000 Uncapper!*

Both motors automatically shut off at the end of the 10 second cycle for either deep or shallow frames and the entire cycle is controlled by a foot switch.

The unit is available head only or complete with drain tray and basket to catch the cappings.

Reasonably priced and compact (small space design) make it an ideal unit for the sideliner or small commercial honey producer. For more details, write Maxant Industries, P.O. Box 454G. Ayer, MA 01432.

MID-CON

Mid-Con Agrimarketing, Inc. has been purchased by Joli Winer and Cecil Sweeney. Mid-Con, known as a national distributor of apicultural pharmaceuticals, including Fumidil-B, Terra-Brood Mix, Terramycin soluble powder and TM500, will continue, and even expand this operation. In addition, they are adding Zoecon's Apistan product line, Perma-Comb products, and a complete line of bee supplies.

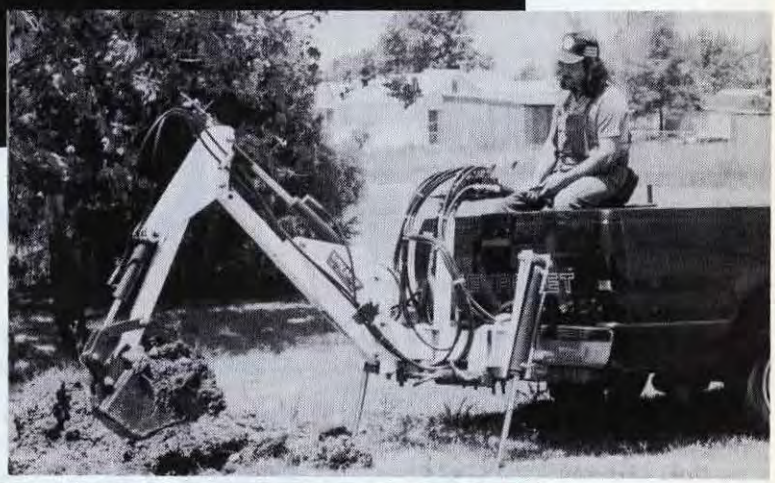
Their new address is 8833 Quivira Rd., Overland Park, KS 66214. (913) 492-1670, FAX (913) 492-2742.

E Z SMOKE

Mann Lake Supply will release their new aerosol bee smoker, *E Z Smoke,* about April 1, 1989. Designed for inspectors or others needing quick access to a colony, this 14 oz., trigger spray release can will go anywhere a smoker can, and even places where one can't.

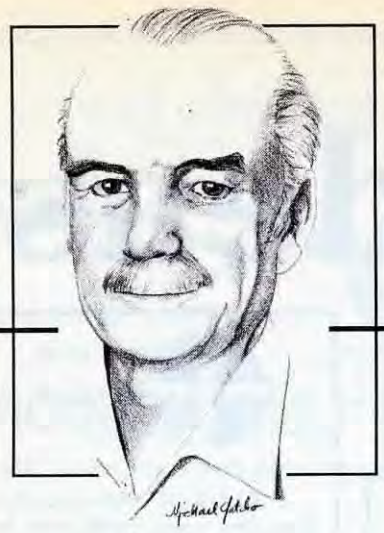
Environmentally and physically safe, the contents contain all FDA approved ingredients. The spray is pleasant to use and is safe for bees and beekeepers.

For more informaton contact: Mann Lake Supply, Hackensack, MN 56452, 1-800-233-6663.



The WAG Co., Inc. has introduced a backhoe for 1/2 ton or larger trucks, tractors, skid-steer loaders, and forklifts. The *Little Dipper* has a swing of 160°, a digging depth of 7', a reach of 9'6", a lifting height of 10', joystick control valves with power beyond capacity for operating hydraulic tools, and a variety of attachments. For more information contact: The WAG Co., Inc. PO Box 1858, Paragould, AR 72451, (501) 239-4796.

The WAG Co., Inc.



THE BEE SPECIALIST

ELBERT R. JAYCOX

5775 Jornada Road North • Las Cruces, NM 88001

"Starting up: Where to get Bees, Queens?"

If you are starting with bees this spring, you have some important decisions to make, far more important than in the past. It used to be a simple act to purchase bees and queens without worrying about anything but what race of bees to use and whether or not they were gentle. You could order packaged bees, buy small colonies (nucs), or find an overwintered colony to buy from a local beekeeper, all without much difficulty.

Of course, there was, and still is, the chance of picking up a case of American foulbrood disease (AFB). This bacterial disease is present at low levels in apiaries throughout the U.S. The disease is readily diagnosed, however, and is controlled by experienced beekeepers. It has not been a serious hazard in purchasing bees.

In contrast, the parasitic mites of honey bees now present in the United States have made it much more risky to buy bees and queens for several reasons. Most important is the difficulty of assuring freedom from mites by *inspecting* the bees as we do with AFB. To be reasonably certain that a colony of bees is free of mites, we must sample that colony and examine the collected bees for the presence of mites. Currently, some states are saying proudly that they are free of mites based on the sampling of apiaries around the state. When you read further and find they looked at only one colony per apiary of up to 30 colonies, you can see how meaningless the survey was and you wonder how they can make such a statement with a straight face.

Should you select a source of bees that have been treated to "eradicate" possible mite infestations? This is probably a better choice than buying bees where claims are made for freedom from mites based on inadequate sampling. But neither menthol treatments for tracheal mite control nor fluvalinate pesticide applied for Varroa mite control can be relied on to kill all the mites present in a colony. And as time goes on, we will quickly see evidence of resistant mites developing in response to the overuse of a single control material — it happens continually in pest control throughout agriculture, particularly with pyrethroid insecticides such as fluvalinate.

The problem of obtaining bees free of parasitic mites has been further complicated by questionable claims made by states, beekeepers, and queen breeders. The state of California tried to maintain a tracheal-mite-free zone of 17 counties in the northern part of the state, and it was used in advertising to promote the safety of buying bees there.

I was a little dubious about the claims when one queen breeder moved his mite-infested bees just down the road to get out of the "clean" area; since that time everything has come apart. Finally, the beekeepers asked for and received permission to use menthol to treat the bees that earlier were declared free of tracheal mites. Recent finds of Varroa mites in several California counties have further damaged the marketing of bees and queens in that state.

Now that I've told you some of the problems of buying bees, you probably want to know what you should do to get started. Obtaining information, the best you can get, is the name of the game. Ask local beekeepers and the bee inspection service or Department of Agriculture of your state about the status of mite infestations in your state. If neither mite has been detected there, purchase bees locally, not by mail or from other sources elsewhere. If only tracheal mites have been found in your state, whether "eradicated" or not, you might as well buy bees locally because the tracheal mites will always be there. Until we import or breed resistant bees, you must take your chances with *Acarapis woodi*, the tracheal mite.

If your informants indicate that Varroa mites have been found in bees in your state, buy bees from another state or, at least, another area that has not yet recorded any *Varroa* in spite of good surveys. Sampling for *Varroa* is generally inadequate, and that mite is far more dangerous than the tracheal mite, so avoid it as long as possible. When both mites become spread throughout the U.S. as they will be, you will be unable to keep your bees free of them or even to control *Varroa* unless all the bees in the area are treated.

There may soon be two reliable sources of bees and queens free of mites. There is one now: Hawaii, where neither destructive mite has been found and where quarantines should prevent their introduction. The second source will be New Zealand, if the U.S. Department of Agriculture (USDA) approves the importation of their bees, as it should. Sample shipments have been brought in by the USDA, and both queens and packaged bees from New Zealand have been widely tested in Canada.

Continued on Page 142

• THE BEE SPECIALIST • ELBERT JAYCOX •

Continued From Page 140

Costly Inspections

It seems likely, perhaps by the time you read this, that there will be some sort of federal regulations in regard to the movement of colonies of bees and the control of Varroa mites. These will be based on sampling and treatment by, or under control of, a state agency. Infested colonies will have to be treated or killed but, since there is no indemnification, killing bees would be voluntary under the federal program. The reports of the proposed regulations sound reasonable; they do not mention what will happen when inspection of migratory bees is required, with the costs to be paid by the beekeeper.

The *Cal-Dak Herald*, the newsletter of a group of California and North Dakota migratory beekeepers, reported on some of the inspection charges in California, where migratory beekeepers are required to authorize inspection of their bees at their own expense. Counties contacted by the newsletter said that the cost of materials used (fluvalinate strips?) would be $5.50/colony inspected. Five percent of each truckload of bees will be inspected. Labor costs of the inspection are to be based on the hourly cost to the county of from $15 to $37.50/hour. Travel expense of about 50 cents/mile and the labor will be charged from home base to return, or "portal to portal" The average cost of inspection is expected to be $500 to $700 per semi-load of bees. If infested bees are found, treatment costs will also be high, with the same labor rate and charges for the pesticide used in the colonies.

According to the same newsletter, officials in Merced County, California, inspected 800 hives of migratory bees in two loads without finding any mites. The total bill to the beekeeper, including labor at $29.69/hour and materials, was $1959! Another unconfirmed report said that a beekeeper returning with his bees to California paid $9000 in advance and was billed an additional $8200 when Varroa mites were found in the colonies.

If these stories are correct, as I believe they are, commercial beekeepers are in danger of bankruptcy. Not only are they subject to inspection *between* states, but also *within* states if there are quarantined and unquarantined areas. Such problems will also affect the segments of agriculture that rely on bees for pollination. The needed bees may not be available or the costs of renting bees will rise high enough to reduce their use on crops such as almonds, melons, and alfalfa seed.

Perhaps the most troubling aspect of the situation for the entire honey industry is the forced use of pesticides within beehives. Fluvalinate strips will be used for detection and control whether the beekeeper likes it or not. One beekeeper told me that he has been unable to get analyses of honey and wax for fluvalinate residues after trying many different places. If federal and state regulations create such problems, then federal and state laboratories should provide analytical services for pesticide residues, particularly fluvalinate, in honey and wax. It will be more critical if amitraz is approved.

As one beekeeper says, "Fluvalinate in honey ain't funny." Δ

Expecting more from your extracting equipment than it's willing to give?!

Cowen Manufacturing may have the answer!

We work hard to give you equipment that meets your needs and more!

Cowen's 18-frame uncapper/extractor is perfect for the one-man operation.

It's easy to operate, and extracts up to 12 boxes per hour.

COWEN MANUFACTURING CO., INC.

Call: (801) 477-3338 or (801) 477-8902
P.O. Box 399
Parowan, Utah 84761 USA

Paul W. Pierce's
Original Plastic Bee Frame
Stronger than wood — molded in one piece and beeswax coated.

For best price, order direct from manufacturer.

Toll Free in California:
1-800-BEE-MOLD
Outside California:
1-800-BEE-COMB

PIERCO, Inc.
17425 Railroad St.
P. O. Box 3607
City of Industry, CA 91744-9990

Pollination Business for Hobbyists

STEVE TABER of Honey Bee Genetics

P. O. Box 1672 • Vacaville, CA 95688

"You can make money in pollination, even if you have only 10 colonies. Here's how!"

As pointed out by my long time friend Roger Morse, beekeeping in the U.S., and particularly here in California, is undergoing dramatic changes. These changes are bringing in more money for beekeepers, and at the same time moving them into the mainstream of American agriculture. More so, I believe than ever before. But, you say, you want no part of this? You are only in it for the honey? You want nothing to do with the pollination business — WHY???

If you are a hobby or part-time beekeeper, you have probably invested a hundred or more dollars in each of your hives. And, if you make 50 or so pounds of honey each year, and you sell that surplus, you probably gross between $50 and $75, or there abouts, for each colony. Now, take a look at the time this takes. Yes — I know it's a hobby and you don't count your time like those people who collect stamps. But just for fun, figure how much time you spend on each colony. Now, for just a tiny bit of time more, you may be able to add another $25 to $35 gross for each colony. I'll tell you this, it makes your spouse a lot happier the next time you order new equipment.

Just because you have only 10 or so colonies don't think you won't be able to place them. Even here in CA there are many small orchards, like almonds and apples, that require pollination service. My longest pollination contract is now over eight years old and involves a 10 acre almond orchard managed by a commercial almond grower. Originally, he only wanted 10 colonies and I told him that I couldn't afford to put just 10 there and wouldn't take the job. But I would do it for 20. He bought it. We have never seen each other, but we talk on the phone maybe twice a year and he gets a bill for pollination services which he promptly pays.

Another option is to get your bees together with those of your bee club, or with a nearby commercial beekeeper who puts bees out for pollination. For instance, in the cape region of South Africa nearly all beekeepers are hobby or part timers. Each spring they band together and place their bees in large orchards for pollination, renting or borrowing a truck to move the bees.

Entering in an agreement with a large beekeeper who is accustomed to making all the arrangements with a grower, may mean you make less per colony. But, since the professional beekeeper makes all the arrangements, he will want his cut on your bees for that service.

But here it's not unusual for a beekeeper to pick up a contract for as many as 2,000 colonies when he only owns 500 (now you know what friends and acquaintances are for). He gets on the phone and starts calling those friends. He is able to pick up 200 here, 350 there, until he has the required number to fulfil the contract. We have gotten in on several such deals, and have always been able to place all our colonies, one way or the other, as most beekeepers in these parts do.

Another idea is to look for new and unusual crops in your area that will benefit from bees. To do this contact your state agricultural college extension service and your county agent about new or unusual crops being grown in your area. One that you will see more and more in the next five years is oil seed rape, or canola. How do I

Continued on Next Page

Bees on a citrus flower.

CAPTURE SWARMS WITH PROVEN! SWARM TRAPS

Using fifteen traps, Beekeeper Paul Brown captured 42 swarms in just three weeks. He'd like to tell you about our SWARM TRAPS!

They last!
After a season, *"they seem as good as new."*

SWARM TRAP
(approximately 31 liter capacity)

They're easy!
Transferring a swarm *"was about a 10 minute job."*

They work!
"During one day I brought home 5 swarms scattered over an area of 25 miles."

FOR MORE INFORMATION CALL OR WRITE

SCENTRY INC.
P.O. Box 426, Dept. CBG
Buckeye, Arizona 85326
(602) 233-1772 Telex: 405123 SI AZ

ITALIAN
3 FRAME NUCS
$29.00 ea.!
Shipped in disposable containers
Sweetwater Apiaries
P.O. BOX 449
TYLERTOWN, MS 39667
601-876-3400 nights

SWARM TRAP

Order your Swarm Trap Kit TODAY in time for swarming.

Beekeepers report captures of 1 to 15 SWARMS in a swarm season with a single trap!

Swarm kit complete with trap, lure and instructions. $12.85 per kit, shipping included.

Send check or money order today to:

GREAT LAKES IPM
10220 Church Rd. N.E.
Vestaburg, MI 48891
(517) 268-5693

Taber . . . Con. from Page 145

know? In just the last six months oil from this seed has been approved by the feds for use in the U.S. The first processing plants are now being built and, in the next few years, look for hybrid soybeans and cotton which will also require bees.

Canola supposedly doesn't need bees to set a good crop, and there are lots of crops like that. So, put your diplomacy to work and convince the grower that bees certainly won't do any harm and because of the existing inconclusive evidence, they most likely will benefit more than enough to pay for the small cost of the bees. That is the route beekeepers used to get into both cranberry and alfalfa pollination contracts.

In Brazil, citrus growers were reluctant to have beekeepers move their colonies into their orchards. They felt the crop was not increased at all by having bees around. However, some of the growers noticed that where there were many bee colonies, there were many more seeds produced in each of the juice-processed fruit. These seeds are an important by-product, and are sold as cattle feed.

Another thing to keep in mind is that when a grower is convinced he needs bees, and the recommendation calls for three colonies/acre, most growers will gamble and contract for only one. Gambling like that works for the grower most of the time (or at least half). But remind him of the cold rainy spells during bloom; the windy days and rotten flying weather that occurs during the other half. Undoubtedly you are increasing your business, but at the same time you are assuring the crop will be adequately pollinated, and that you get the job next year because there is a happy (and richer) grower.

But do your homework first. Be prepared with up-to-date information, which you can get from local Extension offices, on crops and their pollination requirements. You may even need to write to other state offices to get the information you need, but be sure and get it. Dig a little, the rewards will be well worth the effort. As an example, famers in New Zealand started growing Kiwi 15 to 20 years ago. They have done much of the work on pollination requirements for this crop. Then, about eight years ago growers in CA decided to get into the act and began planting Kiwi orchards too. Their best source of information is still New Zealand.

Pollinating a carrot crop.

All beekeepers need a copy of McGregor's book, Ag. Handbook # 46 — *Insect Pollination of Cultivated Crop Plants.* It is available from a variety of sources, but is no longer being printed by the feds. Published in 1976, it is still outstanding in the amount of information it gives.

Hobbies are nice to have, but hobbies with an income are even better. Δ

Broff's Honey Products
106 Forest St., Dept. G
Middleton, MA 01949
(508) 774-3035

Allen's Bee Ranch
1969 - 1989
Queens • Package bees • Certified
At reasonable price.
6040 Smith Lane • Redding, CA 96002
(916) 221-1458

• Feature Article •

No longer a convenience

Pollination Parameters

WILLARD S. ROBINSON, RICHARD NOWOGRODZKI and ROGER A. MORSE
Department of Entomology, Cornell University, Ithaca, NY 14853

Summary

Based on published information and interviews with beekeepers, researchers, and regulators throughout the U.S., we conclude that more than two million rentals of honey bee colonies for crop pollination take place annually. This number is considerably higher than any previously published estimate. Many of the colonies are used on two different crops in the same year, and a small number even pollinate three. Thus, about one million colonies are involved, almost one third of all the beekeeper-managed colonies in the U.S. About 70% of the pollination rentals occur in California, with 650,000 colonies utilized annually on a single crop, almonds. Acreage and/or production has been increasing markedly over the last 20 years for many of the major crops that benefit from bee pollination.

For all of U.S. agriculture, the marginal increase in value attributable to honey bee pollination — that is, the value of the increased yield and quality achieved through pollination by honey bees alone — was about $9.7 billion in 1985. This total is over 68 times the combined sum of all pollination fees paid to beekeepers (estimated at $60.9 million per year) and the cost of the federal honey price support program ($80.8 million in 1985), a benefit/cost ratio of over 68:1.

Strong and healthy colonies are the best pollinators. Profits from honey production are the incentive for beekeepers to maintain such populous, disease-free colonies during the 10 or 11 months of the year they are not being rented for pollination. Any threat to the beekeeping industry that jeopardizes the supply of colonies for pollination would adversely affect much of U.S. agriculture.

Introduction

U.S. farmers today produce an abundance of safe, inexpensive food that is unparalleled elsewhere in the world. They accomplish this through an intensified agricultural system in which the beekeeping industry plays a part. Our intent here is to examine and quantify the role of pollination by honey bees in our agricultural economy and the extent to which this role has been changing in recent years. A stable or increasing demand for pollination by growers of important crops would be a strong argument for maintaining a thriving apiculture industry in this country.

Patterns of Commercial Pollination

Table 1 lists the major crops for which honey bee colonies are rented for pollination in the U.S., with estimates of the number of colonies involved annually. The information was gathered from published sources plus interviews and correspondence with beekeepers, researchers, and regulatory personnel in the various states. Detailed descriptions of the pollination

Table 1. Estimates of total numbers of honey bee colonies rented annually in California and the entire U.S. for pollination of selected crops.

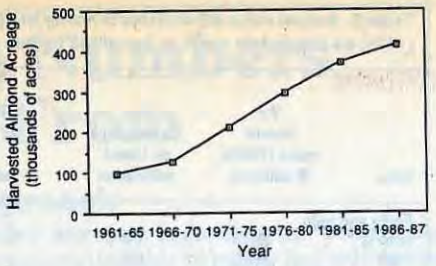
Crop	Major Producing States	Annual Colony Rentals		Number of Colonies Per Acre	
		California	Total U.S.	Recommended	Actual
almond	CA	650,000	650,000	2-5	1.5-5
apple	WA, NY, MI, CA, PA	30,000	250,000	1-2	0.25-2
melon	CA, TX, FLA	200,000	250,000	1-2	1-2
alfalfa seed	CA, ID, WA, OR, NV	200,000	220,000	1-10	3-10
plum/prune	CA, OR, MI, WA, ID	130,000	150,000	1	1-2
avocado	CA	100,000	100,000	2-3	1-2
blueberry	MI, ME, NJ, NC, GA	0	75,000	0.5-10	1-3
cherry	WA, MI, OR, CA	10,000	70,000	1-2	0.33-2
vegetable seeds[a]	CA, many others	35,000[b]	50,000	variable	1-2; 10 (onion seed)
cucumber	NC, MI, SC, FL, TX	5,000	40,000	1-3	0.1-3
pear	CA, WA, OR	0[c]	40,000	1-2	1
sunflower[d]	CA, TX, MN	15,000	40,000	0.5-1	0.67-1
cranberry	MA, WI, NJ, OR, WA	0	30,000	1	1-1.5
kiwifruit	CA	15,000	15,000	3-5	1-5
others[e]	throughout U.S.	35,000[b]	50,000	variable	variable
TOTALS		**1,425,000**	**2,030,000**		

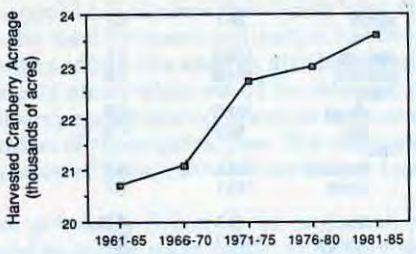
a. Includes seeds for cole crops, cucurbits, celery, carrot, and onion.
b. California totals for these crops estimated as 70% of U.S. totals, the trend shown for other crops.
c. Few colonies are rented for the California pear crop because it consists almost exclusively of the cultivar 'Bartlett', which sets seedless fruit under warm climatic conditions.
d. For production of hybrid seeds.
e. Includes squashes, pumpkin, bramble berries, strawberry, peach, macadamia nut, holly, buckwheat, rape seed, some citrus, some soybean varieties, and seeds for forage legumes other than alfalfa.

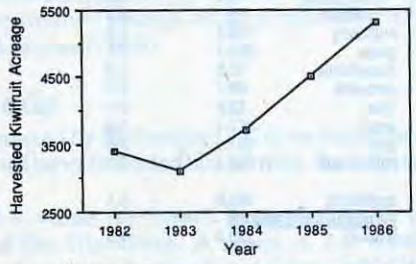
needs of these crops and fuller explanations of how these figures were obtained will be published in the near future (Robinson, Nowogrodzki, and Morse 1989). For many of the crops, estimates of the numbers of colonies involved were quite conservative. Nevertheless, the total of over two million colony rentals a year is considerably higher than the previously published estimates of 0.3-0.5 million colonies a year (Oertel 1983, Levin 1986a). We estimate that, on average, each colony involved in commercial pollination is used on two crops a year, so that one million different colonies are rented annually. This represents over 30% of the 3.2 million U.S. colonies managed by beekeepers (U.S. Department of Agriculture 1988).

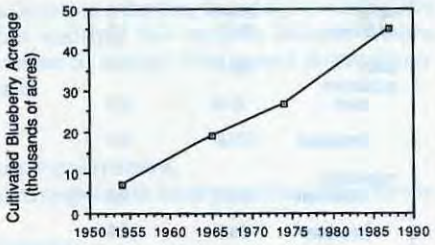
Trends for some of the most important crops that rely on honey bee pollination are illustrated in Figures 1-6. As can be seen, acreage and/or production has been increasing dramatically for most of these crops over the last 10-20 years. Increased use of bees for pollination has accompanied (and, in part, brought about) this growth; for example, the increase in pollination traffic into and out of Maine in the last six years, primarily for the blueberry and apple crops, is illustrated in Figure 7. For most of these crops, the increasing trends can be expected to continue, especially for fruits and berries, which are generally experiencing increases in consumer demand.

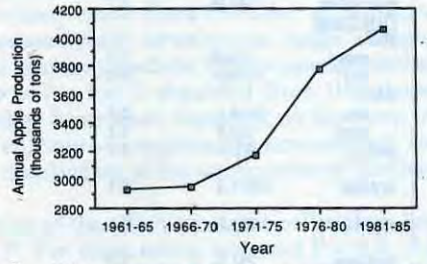
Almost all of the commercial pollination takes place during a short segment of the year, in spring. While they are being rented, the colonies involved often must tolerate somewhat stressful conditions, possibly including a relative scarcity of food and exposure to pesticides. Beekeepers can keep their colonies strong and healthy only by moving them after pollination rental to areas where nectar and pollen are abundant and other conditions are appropriate for beekeeping. Honey production is the incentive for maintaining these colonies during the 10-11 months of the year when they are not involved in commercial pollination.

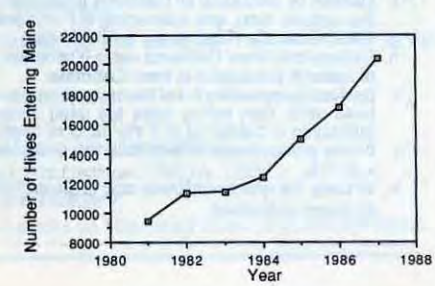












TOP 6 FIGURES. Recent production trends for six crops heavily dependent on commercial honey bee pollination. For almond, cranberry and kiwifruit, figures show harvested acreage; for blueberry, harvested cultivated acreage (wild-growing lowbush blueberries are excluded); for apple and avocado, annual fruit production. For almond, apple, avocado, and cranberry, each data point is the average of the corresponding span of years. Production is expected to continue to increase in the near future for all these crops, with the exception of cranberry.

BOTTOM. The number of honey bee colonies entering Maine each year for pollination of blueberries and apples, 1981-1987.

Background

There has been considerable controversy over the actual dollar value of honey bees to U.S. agriculture. The General Accounting Office (1985) has claimed that the most frequently cited total, about $18.9 billion a year (Levin 1984), is inflated. O'Grady (1987) amended Levin's approach considerably and estimated that honey bee pollination increased the worth of U.S. farm crops by $4.6 billion in 1983. Previous estimates had placed the annual value of insect-pollinated crops in the U.S. at more than $4.5 billion for 1957 (Metcalf et al. 1962) and $7.6 billion for 1971 (Ware 1973, cited in Levin 1984). Martin (1975) estimated the value of fruit, vegetables, and seeds resulting directly from bee pollination, plus the value of crops grown from bee-pollinated seed, at close to $8 billion. He noted that if one added the value of our foods that are dependent upon or benefited by insect pollination, together with the value of beef and dairy products, which are derived from insect-pollinated legumes, the figure for 1970 would approach $40 billion. In any case, changing patterns in many areas of agriculture, including the beekeeping industry, call for a new analysis of this question.

It is amusing now to read C. C. Miller (1918) debating whether or not to accept an estimate by Swiss scientists that the value of honey bees as pollinators was five times their worth as honey producers. The popular generalization in the U.S. at the time was that bees' pollination value was about double the worth of their honey. In contrast, Levin's (1984) figures show the yearly value of pollination at about 143 times the value of honey and beeswax produced in the U.S.

Results and Discussion

Table 2 shows the 1985 value attributable to honey bees for 40 crops benefiting from insect pollination. Of the total value of these crops (over $30 billion), about $9.7 billion, or one third, was due to honey bee pollination in bringing about increased yields and higher quality produce. The total of $9.7 billion is conservative, as we omitted many minor crops whose values are not reported by the USDA. It also leaves out segments of agriculture that have stirred some controversy in past estimates; e.g., we included the value of alfalfa hay, but none of the immense value of dairy or beef production, even though these industries rely so heavily on consumption of alfalfa hay and Levin (1986b) has argued strongly that "this pyramidal effect is one of the strongest justifications for valuing the

contributions of bee pollinators."

The values of D and P we assigned are subject to future revision and refinement. We fully expect such improvements and invite specialists in each crop to contribute more accurate values as the data become available.

Benefit / Cost Analysis

We here compare monetary benefits and costs associated with beekeeper-provided pollination, from the perspective of producers of agricultural crops. We follow the approach of O'Grady (1987) but with some modifications. O'Grady included benefits to home gardeners, but we include here only the monetary benefits directly enjoyed by farmers other than beekeepers. The costs we include are (1) the direct costs to farmers, paid as pollination fees, and (2) the cost, borne by taxpayers, of the federal honey price support program. We use figures for 1985, the latest year for which crop value statistics are available.

The direct benefits to agricultural crops totaled $9.7 billion for 1985 (see Table 2). The cost of the honey price support program in 1985 was $80.8 million ($60.8 million was the net cost of honey loans and purchases, $20.0 million was the cost of honey storage and handling; U.S. Department of Agriculture 1988). Pollination fees across the country vary from $9.50 per colony (Burgett 1988) to $40 per colony (Mayer 1988). We use $30 per colony as an average fee for the estimated 2.03 million colony rentals (see Table 1); this may well be an overestimate.

In Summary

Costs to farmers:
2.03 million colonies x $30/colony
= $60.9 million
Costs to taxpayers:
1985 honey price support program
= $80.8 million
Total cost = $141.7 million
Benefits to farmers:
Crop value (1985) attributable to honey bees
= $9.7 billion

The benefit/cost ratio is over 68:1. Thus, based on the latest complete figures available, honey bee colonies are contributing pollination valued at almost 70 times the monetary compensation to beekeepers. The magnitude of the ratio is striking. Of course, this ratio can be expected to fluctuate with changing patterns of agriculture and federal spending. For example, total costs of the federal honey price support program were $89.4 million in 1986 and $72.6 million in 1987 (U.S. Department

Continued on Page 152

Table 2. Annual value attributable to honey bee pollination of 40 U.S. crops designated by McGregor (1976) as dependent upon or benefited by bee pollination.

Crop	V = Annual value (1985)[a] ($ millions)	D = Dependence on insect pollination	P = Proportion of pollinators that are honey bees[b]	V x D x P = Annual value attributable to honey bees ($ millions)	References[c]
Fruits and nuts					
almond	360.6	1.0	1.0	360.6	McGregor 1976
apple	915.6	1.0	0.9	824.0	Free 1964, Robinson & Fell 1981
apricot	28.1	0.7	0.8	15.7	Jorgensen & Drage 1953 Langridge & Goodman1981
avocado	176.4	1.0	0.9	158.8	Peterson 1955
blueberry	104.6[d]	1.0	0.9	94.1	Marucci 1966
cherry					
sweet	101.0	0.9	0.9	81.8	Hootman 1933
tart	62.9	0.9	0.9	50.9	Hootman 1933
citrus					
grapefruit	308.5	0.8[e]	0.9	222.1	Burger 1985
lemon	168.1	0.2	1.0	33.6	Moffett & Rodney 1975 Moffett & Rodney 1971
lime	19.9	0.3[e]	0.9	5.4	McGregor 1976
orange	1459.3	0.3[e]	0.9	394.0	McGregor 1976
tangelo	34.4	0.4	0.9	12.4	Moffett & Rodney 1973
tangerine	49.4	0.5[e]	0.9	22.2	Moffett & Rodney 1979
temple	26.2	0.3	0.9	7.1	McGregor 1976
cranberry	189.9	1.0	0.9	170.9	Marucci 1967
grape	959.1	0.1	0.1	959.1	McGregor 1976
macadamia	30.5	0.9	0.9	24.7	Urata et al. 1954
nectarine	68.7	0.6	0.8	33.0	McGregor 1976
olive	53.6	0.1	0.1	0.5	Griggs et al. 1975
peach	307.4	0.6	0.8	147.6	McGregor 1976
pear	201.0	0.5[f]	0.9	90.5	McGregor 1976
plum/prune	192.4	0.7	0.9	121.2	Thorp 1981 Thompson & Liu 1972
strawberry	450.8	0.4	0.8	144.3	Connor & Martin 1973
Vegetables and Melons					
broccoli	239.3	1.0	0.9	215.4	Nieuwhof 1969 McGregor 1976
carrot	206.4	1.0	0.9	185.8	Hawthorn et al. 1960
cauliflower	169.1	1.0	0.9	152.2	Nieuwhof 1969 McGregor 1976
celery	189.5	1.0	0.8	151.6	McGregor 1976
cucumbers					
fresh	82.6[g]	0.9	0.9	66.9	Alex 1957 Kauffeld et al. 1975
processed	123.6	0.9	0.9	100.1	Alex 1957 Kauffeld et al. 1975
muskmelon					
cantaloupe	164.4[h]	0.8	0.9	118.4	McGregor & Todd 1952 Chandler & Cocke 1981
honeydew	58.1	0.8	0.9	41.8	McGregor & Todd 1952 Chandler & Cocke 1981
onion	347.2	1.0	0.9	312.5	Jones & Emsweller 1933
watermelon	149.8[g]	0.7	0.9	94.4	Brewer 1974
Field Crops					
alfalfa					
seed	114.8[g]	1.0	0.6[i]	68.9	Vansell & Todd 1946
hay	4719.0[j]	1.0	0.6[j]	2831.4	Vansell & Todd 1946
cotton					
lint	3645.4	0.2	0.8	583.3	McGregor et al. 1955
seed	348.3	0.2	0.8	55.7	McGregor et al. 1955
peanut	1003.4	0.1	0.2	20.1	Girardeau & Leuck 1967 Hammons et al. 1963
soybean	10571.3	0.1	0.5	528.6	Erickson et al. 1978 Erickson 1984
sugarbeet	761.2	0.1	0.2	15.2	Mikitenko 1959 McGregor 1976
sunflower	251.5	1.0[k]	0.9	226.4	Miller 1988
TOTALS	**30,194.3**			**9,743.2**	

a. From USDA (1987).
b. The value for P was assumed to be 0.8 (see text) unless reliable evidence indicated otherwise; also, in cases where honey bees are routinely supplied to a crop, either for pollination or for honey production, we used a value for P of 0.9.
c. Sources for estimates of D and P.
d. From Eck (1988).
e. There is large variation among cultivars for most citrus fruits. Many important cultivars are seedless, requiring no pollination.
f. Derived by excluding all California production, which is largely parthenocarpic and accounts for 0.4 of the national total, and subtracting 0.1 to represent cultivar variation.
g. 1980 value--the most recent available data.
h. Extrapolated from California value (California Agricultural Statistics Service 1987), assuming that 80% of national production is from California.
i. Derived by excluding 0.4 of the national total to represent seed production in the Pacific Northwest, where bees other than honey bees are used almost exclusively; honey bees account for virtually all the pollination in California (0.5 the national total) and in other scattered locations (0.1 the national total).
j. Alfalfa production is 57% of total hay production, which is $9,437 million (USDA 1987): $9437 x 0.57 = $4719.
k. Virtually the entire sunflower crop is grown from hybrid seed, production of which is entirely dependent on insect pollination.

Where The Numbers Come From

Our Approach

To generate estimates useful for policy decisions regarding the beekeeping industry, only increased production of a crop attributable to honey bee pollination should be included. In other words, a study should not assume that honey bees are the only pollinators, even of crops for which the need for insect pollination has been well established. Nor should it count the entire value of a crop as attributable to pollination, only the value of the yield over and above what would be obtained in the absence of all pollinators. Some of the discrepancies among previous estimates are the result of differences in the application of these principles. For example, Levin's (1984) calculations included all species of bees, rather than honey bees alone.

In generating our estimates, we have primarily followed the approach of O'Grady (1987). However, we have attempted to gather more recent and complete data and to base our calculations on more valid assumptions. We believe our figures are the most accurate offered to date. For further details of data collection and analysis, see Robinson, Nowogrodzki, and Morse (1989).

Methods

1. Of the crops grown in the U.S. and designated by McGregor (1976) as dependent upon or benefited by insect pollination, we have included the 40 with the highest annual value.
2. For each of these crops, we assigned a value for insect dependency, D, as precisely as possible after a review of the literature. A value of 1.0 would represent total dependency on insect pollination--that is, the yield would fall to zero if all insects were prevented from visiting the crop in bloom. Where possible, we used results from cage studies to assign this insect dependency value, according to the following formula:

   $D = (Y_o - Y_c)/Y_o$

   where:

   D = dependency of the crop on insect pollinators,

   Yo = open-pollinated yield, or yield in cages with bees provided (whichever value was higher),

   Yc = yield in cages that exclude insects.

   We estimated D to one decimal place. In cases where more than one study was available, results were averaged. For many crops there are clear advantages to insect pollination in addition to increased yield: for example, larger or more uniform size, desirable shape, uniform maturation date, higher market value. For those crops we added 0.1 to the value for D obtained from the above formula. In cases where no cage studies have been reported on the crop in question, or where variations among cultivars or regions are pronounced, we have relied on a relatively subjective distillation of the summaries of McGregor (1976).
3. For each crop, we estimated what fraction of the effective insect pollinators are honey bees; we called this proportion P. For most crops, we used P = 0.8, the baseline value cited by many authors (e.g., Levin 1986, Eckert and Shaw 1960, Barclay and Moffett 1984). However, if honey bees are normally placed in the vicinity of the crop in question, either for pollination or for honey production, we used a value for P of 0.9 to reflect the resulting increased density of honey bees relative to other insect pollinators. If literature on the crop gave a clearer indication of the relative abundance and effectiveness of honey bees, we derived a figure from that account and included a reference.

   Recognizing that D and P can vary widely among cultivars and regions, we focused on economically important cultivars and relevant geographic areas in the U.S., where such information was available.
4. We calculated the honey bee's contribution to the annual value of each crop, using:

   $V_{hb} = V \times D \times P$

   where:

   Vhb = annual value of the crop attributable to honey bees;

   V = annual value given in Agricultural Statistics (USDA 1987);

   D = dependency of the crop on insect pollinators;

   P = proportion of effective insect pollinators of the crop that are honey bees.

Honey Board Helps

The National Honey Board was created to administer the Honey Research, Promotion and Consumer Information Order. As the name implies, the Honey Board is not only involved with advertising and promotion but also sponsors research.

"Often people think of the Honey Board in terms of promotions only," said Dan Hall, manager of the Honey Board. "Market and industry research are part of the National Honey Board's programs."

Recently, in fact, the National Honey Board joined with the USDA's Economic Research Service and Cornell University to sponsor four ambitious research projects:

Value of Honey Bees as Crop Pollinators

The accompanying article, authored by researchers from Cornell University is the result of the first stage of the project.

Economic Analysis of Honey Industry

A second project will construct an econometric model of the honey industry which can be used to evaluate the impacts of policy changes on the honey industry.

"The model will analyze today's honey industry from producer through final sales," said Hall. "The model will help the National Honey Board determine how it can best spend industry funds to get the maximum increase in the demand for honey," he added.

Pollination Service Economic Analysis

The research will also analyze how a change in the federal honey price support program will affect pollination services availability.

Industry Characteristics Assessment

The final research project cosponsored by the National Honey Board, will assess the characteristics of producers, packers, importers and other participants in the U.S. honey industry. The study will update existing information on honey production, pollination, package bee sales, cost of production and marketing practices. Δ

Continued from Page 150

of Agriculture 1988). Also, extending the analysis to encompass home gardens would certainly increase the ratio markedly, since additional benefits (very roughly estimated by O'Grady [1987] at $1.4 billion a year) would be included in the computation, with no additional costs.

Conclusions

- Changes in agricultural crop production in the past two decades have been accompanied by heightened demand for honey bee pollinators. These changes are continuing and the demand for honey bees is increasing.
- A large fraction--over 30%--of the colonies owned by U.S. beekeepers are currently rented for pollination each year. On average, a rental colony is trucked to two commercial crops a year for pollination.
- Total monetary returns to farmers, as measured in added crop value, are many times higher than the current costs of commercial pollination services.
- Currently, honey production is the incentive for beekeepers to maintain strong colonies during the 10-11 months of the year when they are not involved in commercial pollination. Thus, having an adequate supply of pollination colonies depends on beekeepers receiving a high enough price for their honey.
- Threats to the beekeeping industry jeopardize much of U.S. agriculture.

Acknowledgements

Prepared under Cooperative Agreement 58-3AEK-9-80004 between Cornell University and the Economic Research Service, U.S. Department of Agriculture, with funds established by the National Honey Board. We thank Lois Willett for helpful criticism of an earlier version of this paper. Δ

References

Alex, A.H. 1957. *Honeybees aid pollination of cucumbers and cantaloupes.* Progress Report 1936, Texas Agr. Exp. Sta.

Barclay, J.S., and J.O. Moffett. 1984. *The pollination value of honey bees to wildlife.* Amer. Bee J. 124:497-498.

Brewer, J.W. 1974. *Pollination requirements for watermelon seed production.* J. Apic. Res. 13:207-212.

Burger, D.W. 1985. *Fruit production of caged 'Star Ruby' grapefruit trees.* J. Rio Grande Valley Hort. Soc. 38:15-18.

Burgett, D.M., Department of Entomology, Oregon State University. 1988. Personal communication.

California Agricultural Statistics. 1987. *California vegetable crops.* California Crop and Livestock Reporting Service.

Chandler, L.D., and J. Cocke. 1981. *Effects of honey bees on cantaloupe yield in the Lower Rio Grande Valley in Texas.* Southwestern Entomologist 6:233-236.

Connor, L.J., and E.C. Martin. 1973. *Components of pollination of commercial strawberrries in Michigan.* HortScience 8:304-306.

Eck, P. 1988. *Blueberry science.* Rutgers University Press, New Brunswick, N.J.

Eckert, J.E., and F.R. Shaw. 1960. *Beekeeping.* Macmillan, New York.

Erickson, E.H. 1984. *Soybean pollination and honey production — a research progress report.* Gleanings in Bee Culture 112:575-579.

_____, G.A. Berger, J.G. Shannon, and J.M. Robins. 1978. *Honey bee pollination increases soybean yields in the Mississippi Delta region of Arkansas and Missouri.* J. Econ. Ent. 71:601-603.

Free, J.B. 1964. *Comparison of the importance of insect and wind pollination of apple trees.* Nature 201:726.

Girardeau, J.H., and D.B. Leuck. 1967. *Effect of mechanical and bee tripping on yield of the peanut.* J. Econ. Ent. 60:1454-1455.

Griggs, W.H., H.T. Hartmann, M.V. Bradley, B.T. Iwakiri, and J.E. Whisler. 1975. *Olive pollination in California.* Bull. Calif. Agr. Exp. Sta. 869.

Hammons, R.O., K.V. Krombein, and D.B. Leuck. 1963. *Some bees (Apoidea) associated with peanut flowering.* J. Econ. Ent. 56:905.

Hawthorn, L.R., G.E. Bohart, E.H. O'Toole, and others. 1960. *Carrot seed production as affected by insect pollination.* Bull. Utah Agr. Exp. Sta. 422.

Hootman, H.D. 1933. *The importance of pollination and the honeybee in fruit yields.* Mo. State Hort. Soc. Proc. 33:24-36.

Jones, D.F., and S.L. Emsweller. 1933. *Methods of breeding onions.* Hilgardia 7:625-642.

Jorgensen, C., and C.M. Drage. 1953. *Pollination of Colorado fruit.* Colo. Agr. Exp. Sta. and Ext. Serv. Bul. 427-A.

Kauffeld, N., T. Hernandez, J. Wright, and S. Misaraca. 1975. *Cucumber production in Louisiana with honey bees as pollinators.* Amer. Bee J. 115:94-95, 101.

Langridge, D.F., and R.D. Goodman. 1981. *Honeybee pollination of the apricot cv.* Trevalt. Australian J. Exp. Agr. Anim. Husb. 21:241-244.

Levin, M.D. 1984. *Value of bee pollination to United States agriculture.* Amer. Bee J. 124:184-186.

_____. 1986a. *Using honey bees to pollinate crops.* Leaflet 549, Agr. Res. Serv. and Ext. Serv., U.S. Dept. Agr., Washington, D.C..

_____. 1986b. *Honey bees do pay their way.* Amer. Bee J. 126:366-369.

Martin, E.C. 1975. *The use of bees for crop pollination.* Pages 579-614 in The hive and the honey bee. Revised edition. Dadant & Sons, Hamilton, Illinois.

Marucci, P.E. 1966. *Blueberry pollination.* 33rd Ann. Blueberry Open House Proc. N.J. Agr. Exp. Sta. 33:16-19.

_____. 1967. *Cranberry pollination.* Amer. Bee J. 107:212-213.

Mayer, D.F., Department of Entomology, Washington State University. 1988. Personal communication.

McGregor, S.E. 1976. *Insect pollination of cultivated crop plants.* USDA-ARS Agr. Handbook 496.

McGregor, S.E., and F.E. Todd. 1952. *No bees, no melons.* Prog. Agr. in Ariz. 4(2):3.

McGregor, S.E., C. Rhyne, S. Worley, and F.E. Todd. 1955. *The role of honey bees in cotton pollination.* Agron. J. 47:23-25.

Metcalf, C.L., W.P. Flint, and R.L. Metcalf. 1962. *Destructive and useful insects.* 4th edition. McGraw-Hill, New York. 1087 pp.

Mikitenko, A.S. 1959. *Bees increase the seed crop of sugar beet.* [In Russian] Pchelovodstvo 36(5):28-29.

Miller, C.C. 1918. *Stray straws.* Gleanings in Bee Culture 46:281.

Miller, J., Research geneticist, USDA-ARS Oilseed Research Group. 1988. Personal communication.

Moffett, J.O., and D.R. Rodney. 1971. *Honey bee visits to citrus flowers. J.* Ariz. Acad. Sci. 6:254-259.

Moffett, J.O., and D.R. Rodney. 1973. *Honey bee visits increase yields of 'Orlando' tangelo.* HortScience 8:100.

Moffett, J.O., and D.R. Rodney. 1975. *Effect of honey bee visits on the yields of caged lemon trees.* Amer. Bee J. 115:310-311, 313.

Moffett, J.O., and D.R. Rodney 1979. *Pollination requirements of Fremonts, Fairchilds.* Citrograph 64:243, 252.

Nieuwhof, M. 1969. *Cole crops.* Leonard Hill, London.

Oertel, E. 1983. *Estimated honey bee pollination business in selected states.* Amer. Bee J. 123:200-201.

O'Grady, J.H. 1987. *Market failure in the provision of honeybee pollination: a heuristic investigation.* M.S. thesis, University of Vermont.

Peterson, P.A. 1955. *Avocado flower pollination and fruit set.* Calif. Avocado Soc. Yearbook 39:163-169.

Robinson, W.S., R. Nowogrodzki, and R.A. Morse. 1989. *The value of honey bees as pollinators of U.S. crops.* Agricultural Economic Report, Economic Research Service, U.S. Department of Agriculture. In press.

Thompson, M.M., and L.J. Liu. 1972. *Pollination and erratic bearing in 'Italian' prunes.* J. Amer. Soc. Hort. Sci. 97:489-491.

Thorp, R.W. 1981. *Bee management for prune pollination.* Pages 53-55 in Prune orchard management. D.E. Ramos, ed. Univ. Calif. Div. Agr. Sci. Spec. Publ. 3269.

U.S. Department of Agriculture. 1987. Agricultural Statistics. GPO, Washington.

U.S. Department of Agriculture. 1988. *Report on U.S. honey imports.* Economic Research Service, U.S. Department of Agriculture, Washington, D.C.

U.S. General Accounting Office. 1985. *Federal price support for honey should be phased out.* GAO/RCED-85-107. GPO, Washington, D.C.

Urata, U. 1954. *Pollination requirements of macadamia.* Hawaii Agr. Exp. Sta. Tech. Bul. 22.

Vansell, G.H., and F.E. Todd. 1946. *Alfalfa tripping by insects.* Amer. Soc. Agron. J. 38:470-488.

Testing Your Beekeeping Knowledge

By CLARENCE H. COLLISON
Pennsylvania State University • University Park, PA 16802

The preparation of apiary products for exhibition and competition requires the beekeeper to not only select a product of superior quality but to display it with high standards of showmanship. Participating in a local, regional or national honey show is an excellent way to learn more about the quality of honey bee products and promote your products to the general public.

How well do you understand product quality and the criteria that judges use in determining the winners of each individual class? Please take a few minutes and answer the following questions to determine how well you understand this important topic.

The first 5 questions are true and false. Place a 'T' in front of the statement if entirely true and an 'F' if any part of the statement is incorrect. (Each question is worth 1 point).

1. ___ Flavor is an extremely important consideration in the judging of liquid extracted honey.
2. ___ Round comb honey sections normally have less uncapped cells than basswood sections.
3. ___ Tiny perforations in the cappings of section comb honey are a result of wax moth feeding.
4. ___ Mead with a cloudy appearance is an indication that the fermentation process was not complete when the honey wine was bottled.
5. ___ The principle cause of cracks in molded beeswax is due to impurities in the wax, such as honey or dirt.

Multiple Choice Questions

(1 point each)

6. ___ Honey that has a moisture content greater than ___% is disqualified from most honey shows. A) 16.8; B) 18.6; C) 19.2; D) 17.4; E)18.0.
7. ___ All of the following criteria are used in judging creamed honey ***except:*** A) texture; B) absence of grittiness; C) absence of foam; D) flavor; E) moisture content.
8. Name four primary criteria used in the judging of section comb honey. (4 points).

_____

_____

_____

_____

9. A ring of foam on a jar of honey is frowned upon by honey judges. Please indicate the source of foam and the best way to avoid it. (2 points).

_____

_____

10. Liquid honey in a show should be crystal clear in appearance. In addition to foam and moisture level, name two other honey qualities that will cause the entry to lose points. (2 points).

_____

_____

11. Name two circumstances that will result in honey having an off-flavor. (2 points).

_____

_____

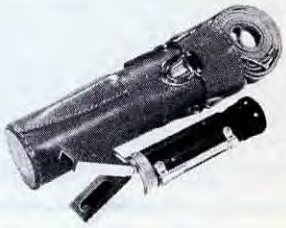
12. Below are pictured three pieces of equipment that are often used in setting up and judging a honey show. Name each piece of equipment. (3 points).

A. _____

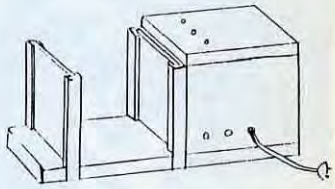
B. _____

C. _____

A



B



C

Extra Credit Questions

Honey is known to contain five biologically active enzymes. Please match the following enzymes with their appropriate action.

A) Invertase; B) Diastase (amylase);
C) Glucose-oxidase; D) Catalase;
E) Acid Phosphatase

13. ___ Enzyme responsible for the production of gluconic acid and hydrogen peroxide in dilute honey.
14. ___ Responsible for splitting sucrose into glucose and fructose.
15. ___ Enzyme that aids in converting starch to sugar.
16. ___ Function unknown.
17. ___ Regulates the activity and balance of glucose oxidase.

Answers on Page 180

Carniolans and Italian Queens
Available from March 15th to May 1st. Fumidil-B fed apiaries.

We have available - FORSSAPIN® -
A vitamin and mineral supplement for syrup feeding. Which increases brood rearing and helps bees ability to resist all diseases.

MIKSA HONEY FARMS
David and Linda Miksa
Rt. 1, Box 820 • Groveland, FL 32736 • (904) 429-3447

POLLINATION

RICHARD D. FELL

As almost every beekeeper knows, pollination is essential to the production of many cultivated crops.

A number of commonly grown fruits and vegetables require cross-pollination before fruit can be set; others are self-pollinating but benefit from cross-pollination. Gardeners interested in producing big yields of quality fruit and vegetables need to consider the pollination requirements of the plants they grow. Without good pollination many of the advantages from improved plant genetics, varietal selection, soil fertility, and pest and disease control practices are lost.

However, many gardeners know little about the pollination requirements of their garden or orchard plants. This is one area in which beekeepers can not only provide assistance and information, but also promote the importance of beekeeping and the honey bee.

Apples are a crop requiring good cross pollination with pollen from a compatible variety. Poor pollination can lead to increased drop and misshapen fruit.

Several common garden plants are self-pollinating and self-fertile, meaning the plant uses its own pollen and is capable of accomplishing the transfer to the stigma. In some plants, pollen is released before the flower opens so that pollination occurs automatically. Garden peas and snap beans possess self-pollinating flowers like this. Gardeners need not be concerned with pollination when growing these legumes.

Other plants have self-pollinating flowers but rely on wind or insects to help accomplish the movement of pollen from the anther to the stigma. Tomato blossoms, for example, need to be shaken or vibrated by the wind to release pollen onto the stigma.

Plants which are not self-fertile and self-pollinating need to receive pollen from flowers on other plants. This transfer can occur by several means and different plants have adapted to the use of various pollination agents. The most common of these are wind and insects, but other agents include birds, bats, and in some cases even water.

Wind is the primary pollinating agent of grass crops such as corn. In sweet corn, wind (and gravity) move the pollen from the tassels (the male flower) to the silk, the elongated style of the female flower. Pollen that lands on the silk germinates and the pollen tube grows down the silk to fertilize the ovule, leading to the formation of each individual kernel.

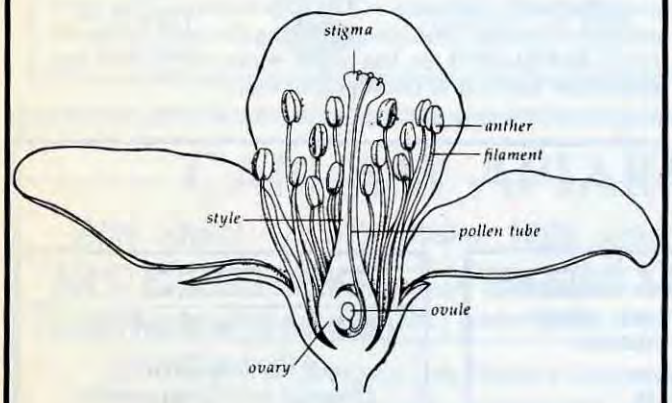
Plants which are wind pollinated tend to have small, somewhat inconspicuous flowers that are single sexed. In contrast, insect pollinated flowers are usually brightly colored, conspicuous and scented characters that attract insect pollinators. Many insects visit flowers, but the most important pollinators are bees. Honey bees and bumblebees are commonly recognized as pollinators, but many bee species also help. However, for most cultivated plants, the honey bee is the most important pollinator, both in terms of abundance and efficiency.

An insect's success as a pollinator depends on a number of factors, such as it's behavior on and between flowers. However, successful pollination also depends on several

Coming to Terms

In its simplest sense pollination is the transfer of **pollen** (the male gamete) from the **anther** (the pollen producing structure of the flower) to the **stigma**, the receptive female structure of the flower (see below). When this process occurs between sexual parts of the same flower, it is referred to as **self-pollination**. The transfer of pollen between different flowers is referred to as **cross-pollination.** This terminology can sometimes lead to confusion since pollen can be transferred from flowers on the same plant or between flowers on different plants. Both situations can be referred to as cross-pollination. However, cross-pollination is better used only in reference to the transfer of pollen between flowers on different plants, and in particular, to the transfer of pollen between plants which have different genetic constitutions.

Pollen grains which have been transferred to the stigma adhere to the stigmatic surfaces, if it is receptive. In many flowers the stigma has short outgrowths to which the pollen grains adhere, in other species the stigma produces a sticky secretion to hold the pollen grains. If the pollen is **viable,** it will **germinate,** and produce a **pollen tube** which grows down through the style and into the ovary, where fertilization of the ovule occurs. **Fertilization** then leads to the production of a **seed** and in most of the cultivated plants the formation of the **fruit.**



The reproductive structures of a generalized flower. The anther and filament together form the stamen; the ring of stamens is referred to as the androecium. The stigma, style and ovary form the pistil. Flowers may have either a simple or a compound pistil that is formed of multiple carpels (units with a stigma, style and ovary). (Figure is modified from Jensen, W.A. and F.B. Salisbury 1972. Botany: An Ecological Approach.)

plant related factors which the beekeeper (and gardener) should be aware. The three requirements of successful pollination are the presence of: (1) viable pollen, (2) a receptive stigma, and (3) compatibility. The later is particularly important since the pollen and the stigma must be related or fertilization will not occur.

Many commonly grown fruit trees have compatibility problems which can affect fruit production. For example, the pollen from the Red Delicious is self-incompatible. Red Delicious must be cross-pollinated with pollen from a compatible variety, such as Golden Delicious. If you plant Red Delicious trees, at least one other compatible variety must be planted nearby to insure successful pollination. In fact, interplanting different varieties is a good rule to follow with all apples, since no variety should be considered as perfectly self-fruitful. The selection of good pollenizers must also take into account the time of bloom. Early blooming apple varieties such as Paulared cannot be used as reliable pollenizers of late blooming varieties such as Rome. Bees readily work the blossoms of both varieties, but cannot transfer pollen between the two if the bloom times do not overlap. Also, some apple varieties such as Winesap and Staymen are not good pollen sources and should not be planted as pollenizers for any variety (see Apple Helper).

Compatibility problems also occur with other types of fruit. Careful selection is important when planting European or Japanese plums, pears or sweet cherries. Most varieties are not self-compatible (or at best only partially self-fruitful) and require cross-pollination with another variety. Sour cherries, peaches, nectarines and apricots, on the other hand, are self-fruitful and can be planted singly. Information on compatibility and bloom time for different fruit crops can be obtained from most commercial nurseries.

"Everyone needs to understand the role the honey bee plays in what we eat — daily."

Other fruits and vegetables have pollination requirements which can affect production and quality. Plants in the curcubit family, which include cucumbers, squash, pumpkins, cantaloupes and watermelons, have separate sexed flowers. Bees are needed to transfer the pollen from the male flower to the female flower before fertilization and fruit set occurs. (Most of the cantaloupes grown in the U.S. provide an interesting exception. They have male [staminate], and hermaphrodite flowers [both sexes]. However the pollen is sticky and needs to be transferred by insects. Without bees or other insects no fruit development occurs.) For good quality fruit multiple visits are necessary. Cucumber and cantaloupe flowers require at least 8-12 visits, and cantaloupes with fewer than 400 seeds are generally small.

The pollination of these plants is also affected by blossom longevity. The female blossoms are only receptive to pollen for a few hours in the morning. The effective pollination period of cantaloupes can be as short as a few minutes under hot, dry conditions. For successful pollination bees must visit the blossoms in the morning. Good pollination requires approximately one bee per 10 female (or hermaphrodite) flowers.

Other plants are self-pollinating and self-fruitful but the

Continued on Page 156

Continued from Page 155

production and quality can be improved by insect pollination. This includes raspberries, blackberries and strawberries. Self pollination is the norm but bee visitation insures fertilization of all ovules. Complete pollination is necessary for maximum berry size and perfectly shaped fruit, while inadequate pollination gives small, malformed fruit.

Careful selection of compatible varieties and maintaining healthy plants provides the basis for good pollination and production, but gardeners must also be aware of the need for bees. In most gardens sufficient numbers of bees are still available to accomplish the required pollination, provided insecticides are used carefully. Bees, from nearby feral (wild) colonies, or neighboring beekeepers are common in most gardens. However, low production and small or misshapen fruits and vegetables often indicate inadequate pollination.

The solution to this is obvious to a beekeeper, but others may need to be made aware of their need for honey bees. Having a nearby colony of bees often solves this problem. This solution not only helps insure that pollination needs are met, but also increases gardeners' awareness of honey bees, the need to protect them and the role they play in pollination and what we eat — daily. Δ

***Dr. Richard Fell** is an associate professor of entomology at Virginia Polytechnic Institute and State University. He teaches apiculture at the Virginia Tech campus and runs the University apiculture extension program. Cuttent research includes studies on apple and sunflower pollination and the development of analytical techniques for the analysis of sugars in nectar and insect blood samples.*

Apple Helper

In 1899, M.B. Waite found that apples benefit from cross-pollination between cultivars. He also found that insects were transferring the pollen between trees. Orchards have not been the same since.

Even today scientists are fine-tuning the process, so that orchards continue to produce their maximum. But like all biological systems, it hasn't always gone as predicted. Several improvements have been made over the years, the most notable being to provide crabapples as the pollen source in orchards.

Crabapples, when chosen carefully can overcome the disadvantages of solid block plantings, and the bloom time problems often seen between cultivars. For instance, when one apple cultivar is planted in a large block (several acres), it is very difficult for pollen from a different, compatible cultivar to reach the flowers so fruit set can occur.

Even when two or three cultivars of apples are interplanted, and one blooms much earlier, or later, than the others, the likelihood of a compatible pollen reaching it's flowers is slim.

Crabapples can solve both problems, and even a couple of others. First, crabapples take up little space in a planting, an obvious advantage. Second, by careful selection, crabapples varities with early, mid and late bloom dates can be chosen. Finally, only a very few crabapple trees can service a large block of single variety trees.

But the system's not quite perfect. For instance, not all apple blossoms are the same color — and bees notice things like that.

Dan Mayer and Carl Johansen, extension Entomologists at Washington State University in Prosser, have found that on some occasions, even when crabapples have been interplanted in large blocks, good pollination and thus fruit set have not occurred.

They discovered that bees that are working a white flowered apple variety, would often not visit a red flowered variety of crabapple — hence, no pollination. They also found that honey bees working a row of apple trees were unlikely to move to the next row during any one foraging visit — thus not receiving pollen from a donor, unless that donor was in the row.

The researchers also studied a great number of crabapple varieties to determine blooming dates. When coupled with the color and placement information they compiled, apple growers will be able to choose the right colored crabapple, that blooms during the most optimum time, and plant it in the right place to ensure the maximum amount of cross-pollination.

THREE BANDED ITALIANS • PACKAGE BEES & QUEENS

Price includes postage/insurance, starting April 1, 1989. Fumidil-B fed to pkg. colonies and Queen Nucs. Mite Free & Health certificate furnished with all shipments.

Queens Only	2# w/Queen	3# w/Queen
1-4 . . . $6.00	$20.50	$25.50
5-24 . $5.75	$20.25	$25.00
25-49 $5.50	$19.25	$24.25
50-up . $5.25	$18.75	$23.75

$1.00 per package discount if order is paid in full by February 1st, 1989.
Write or call for price on packages picked up at our Apiary or WE DELIVER.

Gregg & Sons Honey Bee Farm
Rt. 2, BOX 92 • MILLRY, AL 36558
(205) 846-2366 or (205) 846-2662 after 6:00 p.m

FRESH BEE POLLEN!!

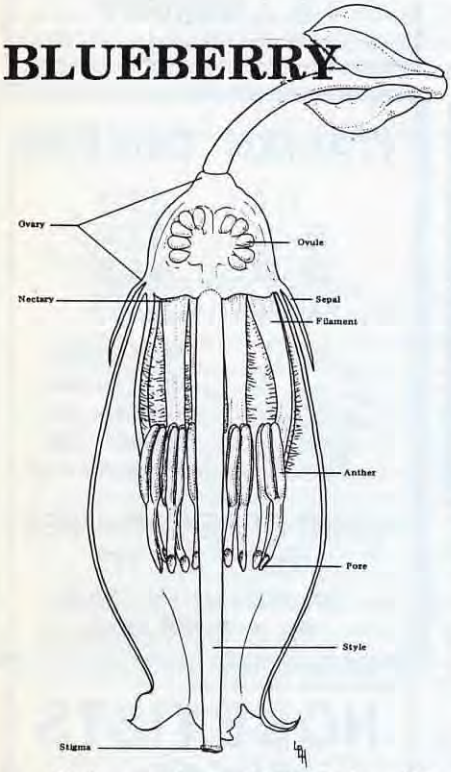
Collected in the desert region of the southwest.
Cleaned and Consumable.
$4.50 per lb.
Plus shipping • 5 lb. Minimum.

FIELD HONEY CO.
(Formerly Fenn Honey Co.)
9341 E. 39th Street. • Tucson, AZ 85730
(602) 744-3782

TOSSED SALAD

Drawings by McGregor

BLUEBERRY



Maine produces 98% of the wild blueberries in the United States. In 1987 slightly over 46 million pounds were harvested from about 25,000 acres — and over 21,000 colonies came to Maine to help.

Blueberry growers pay $25-$28 rental per colony, but that colony helps produce about 1600 pounds of berries on that acre.

The farmgate and value added dollars total just over $50 million each year, a significant amount of income for Maine. Few growers dispute the value of honey bees.

Honey bee visitation increases cross pollination, between the many wild varities that grow on each acre. This results in more and bigger berries, that mature sooner than self pollinated berries. Further, without honey bees, growers estimate fully a 50% reduction in yield.

It's obvious that honey bees and blueberries do well together. It's also obvious that anything that interrupted the flow of colonies to Maine each May would be catastrophic to blueberry growers — and blueberry eaters. Δ

Primary strawberry flowers consist of a center cone-like structure called the receptacle, which is covered with 300 - 500 pistils. This will eventually become the berry. Later flowers may only have a third that number.

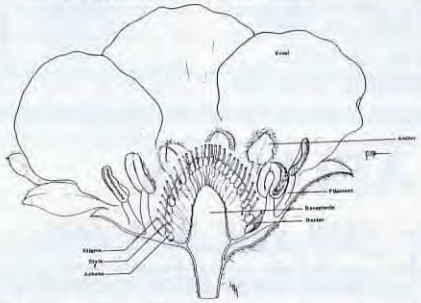
Each pistil must be pollinated, and while some self-pollination occurs, much of the unassisted pollination is a result of wind moving pollen to pistal. Each pollinated pistil stimulates the receptacle underneath to grow. A large number of well-pollinated pistils will produce a large, well-formed strawberry.

Many strawberry cultivars are good at self and wind pollination, and will produce a marketable crop. Does that mean that bees are not required for strawberry pollination?

NO!

Under specific conditions, bees are certainly required:

1. Certain cultivars have very short stamens, while others are long and the attached anthers tower over the receptacle. Obviously the cultivars with tall stamens do a better job of self and wind pollination than do short-stamened cultivars.



STRAWBERRY

2. Early-blooming flowers of nearly all cultivars have shorter stamens than later flowers on the same plant. This means that the first potential set of berries is often lost because of poor self-pollination.

Mother nature provides a simple tool to tell if each pistil is pollinated — pollinated pistals turn dark soon after pollination, while unpollinated pistils retain their bright green-yellow color, even after the petals fall off — certainly an avoidable problem. Δ

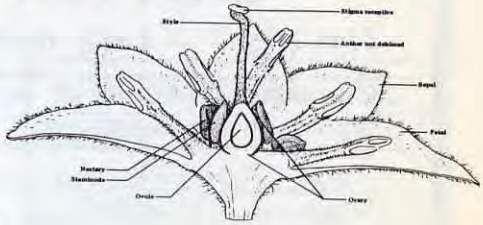
Avocado flowers are unusual in the plant kingdom, and not yet thoroughly understood. Though avocado trees produce hundreds of flowers, only a fraction of 1% may set fruit. The reasons are just beginning to become clear.

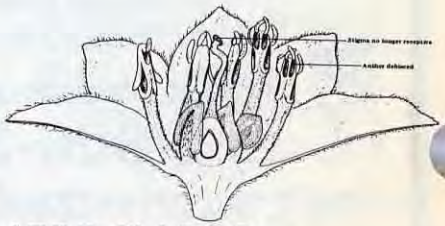
One problem is the behavior of their flowers which are called *dichogamous,* meaning they have a distinct female and male period. This allows the tree to cross pollinate rather than self pollinate. When the flowers first open the stigma is displayed and is receptive for pollen. This occurs at a specific time of day, depending on variety.

Then the flowers close. A tree's flowers will all close almost simultaneously, and will stay closed from an hour, to over night, depending on variety. Then, when the flowers open a second time they will display the stamens and anthers. The stigma is desiccated and no longer receptive when the anthers begin to produce pollen.

Avocado pollen grains are coated with a sticky substance which causes them to clump together, requiring insect pollination. While the honey bee is the most likely candidate, other insects may be more efficient, especially in the tropics.

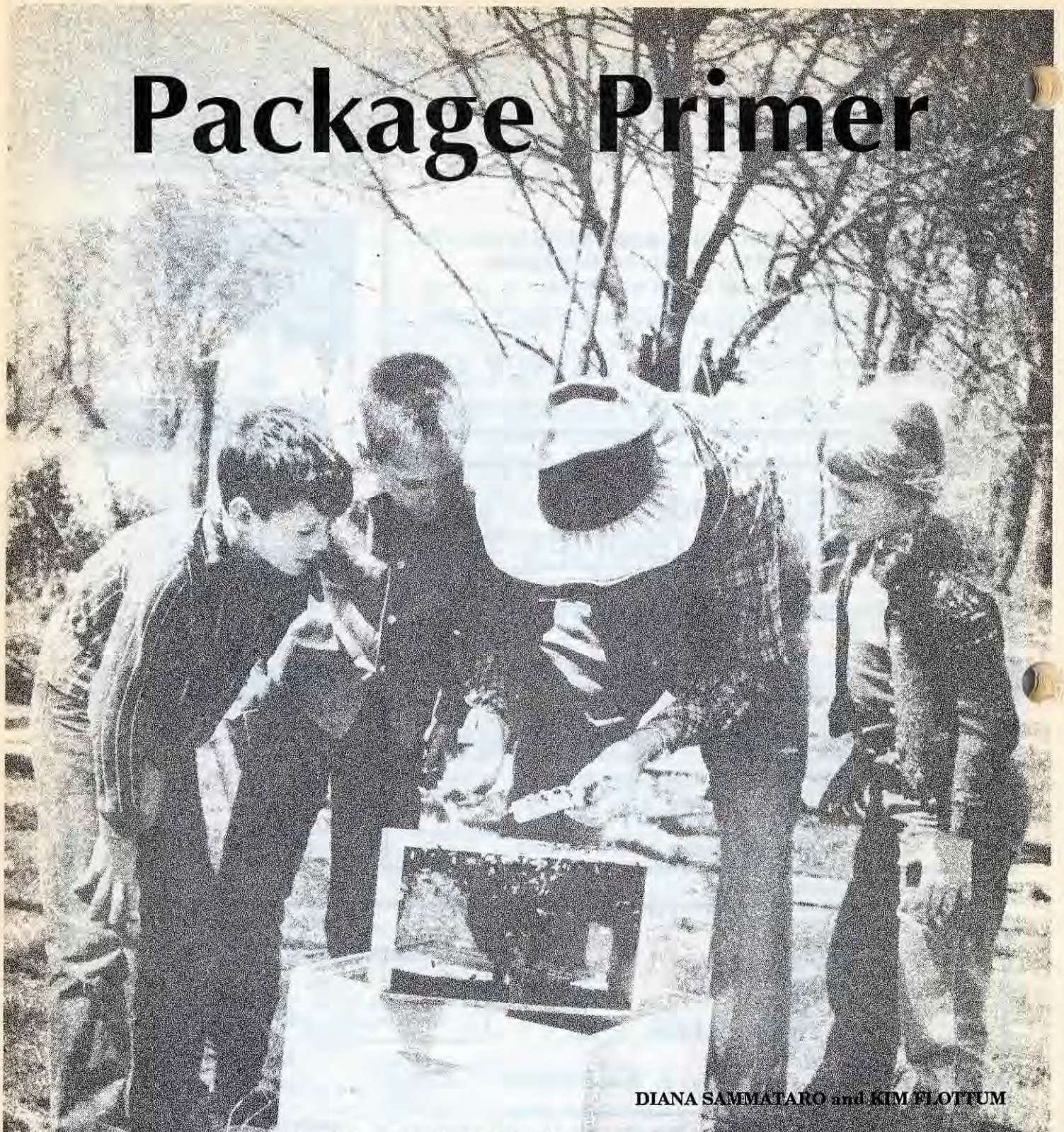
According to some researchers, avocado flowers are not particularly attractive to honey bees, who prefer citrus and other wild flowers. This may be due to the different varieties of avocado, since some are very attractive. Δ





AVOCADO

Package Primer



DIANA SAMMATARO and KIM FLOTTUM

The day has finally arrived — the phone number you left at the post office was put to good use early this morning.

"You have bees at the post office," your local postal worker says. "Please come and pick them up." Is there a slight edge to her voice?

The first thing to do is pick up your bees — even if you're on your way to work. Take them to work — it will cause a sensation and also gives you an opportunity to explain about bees to a whole new audience! And you might pick up a few customers when the honey harvest rolls around.

Whatever you do, don't leave them at the post office — they might put them outside where it's too cold or next to the heater where it's too hot!

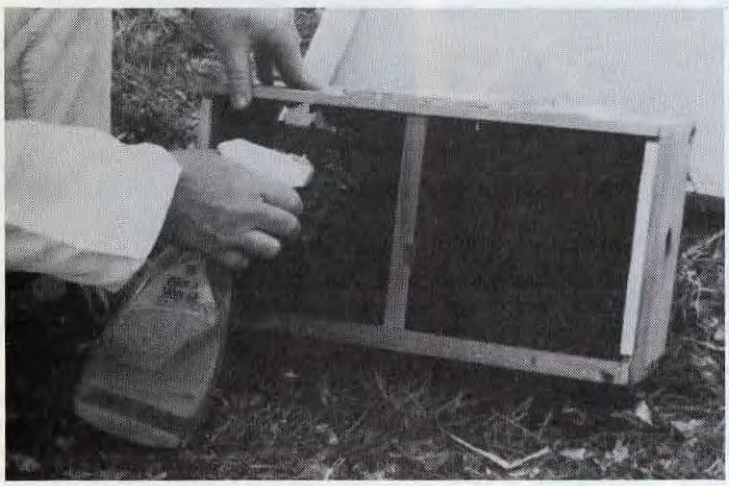
Store your packages in a cool (60°F, dark spot, until late afternoon. If the weather is too cold (i.e. snowing or sleeting) or raining hard, wait until a better day. The ideal weather is a cloudy 60°F late afternoon, early evening.

If you are delayed more than one day, you may wish to feed your bees more syrup, as their feeder-can that comes with the package may be empty.

Mix equal proportions of hot (200°F) water with *white* sugar, allow to cool slightly and place into a mason or other appropriate jar. Punch 2 or 3 *small* holes in the lid and sprinkle in the wire mesh. You can also spray it on with a clean sprayer.

Installation Day

Finally — the day to put your bees into their new home. Your hive has been set up in it's apiary for a week or more, just waiting! It's late afternoon on a calm warm day, with fruit trees and dandelions starting to bloom — *perfect*! Are you ready? Here we go.



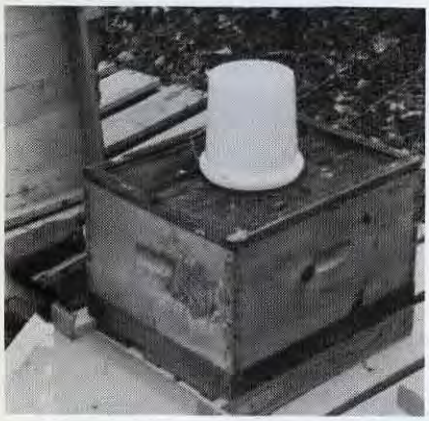
1. Take your bees out to the apiary and set a package on top of each new hive. Now go down the line and with a brand new hand sprayer, (used *only* for feeding bees) spray each package with warm sugar syrup. If the weather is cool, don't soak the bees as they may become chilled. Pick up each package and knock the bottom fairly hard against the ground to dislodge the bee cluster making certain it settles on the bottom of the package. Spray again and look at the queen cage. You should be able to see the queen walking around inside her special cage. If you think the queen is dead, put that package aside for the moment.

2. Starting at one end of the line, take your hive tool and pry off the lid covering the feeder can. The bees won't get out, yet. Dislodge the bees again, and spray them. Now, pry up the feeder can and slowly pull it out. Keep your finger on the queen tab! (You may have to tilt the cage up.) Once out, grab the metal tab holding the queen cage and lift it out. Cover the hole by turning the lid over or putting the feeder can back in.

3. Check the queen again and look for the white fondant candy plug. One end of the cage has cork covering the candy — take a twig or nail and pry out the cork. Now punch a small, narrow hole in the candy, being careful NOT to impale the queen.

4. Now you have your choice. You can either place the queen cage (candy end up) between two frames or on top of (but between) two frames (screen down).

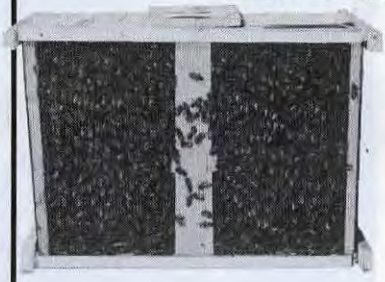
To keep the queen warm, uncover the hole in the package and pour about a cupful of bees over the queen.

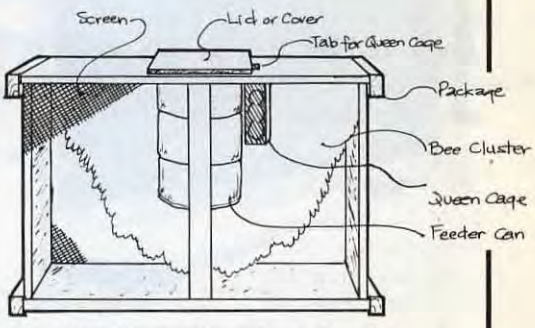


Now place your feeder pail over the frames and place an empty super rim around the feeder, and cover it. (Do not place feeder directly *over* the queen cage in case it leaks, she may drown.)

5. Take your package, still full of bees well gorged with syrup and dump them at the hive entrance. You may have to spray them again. If your hive is on a stand (no more than 8" off the ground) place a sheet of cardboard down so the bees can find their way in quickly. By dumping the bees outside, only live bees will walk in leaving the dead bees outside. This makes early house cleaning for the bees easy, and reduces the chance of dead bees blocking the entrance or endangering the release time of the queen. If bees start to fly, spray with sugar syrup. Bang the cage around carefully until all the bees are out.

Looking Back





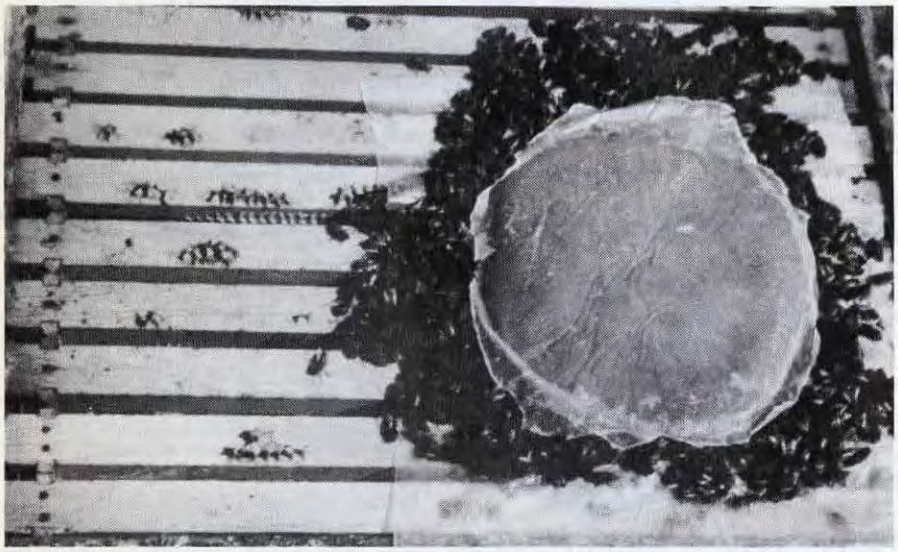
The invention of bees packed in screen boxes is attributed to A. I. Root in 1879. He experimented with 1/2 pound screened boxes of bees to reduce the shipping weight. A full hive of bees, heavy with comb and wood was expensive and difficult to ship. One half to four pound packages could be shipped very inexpensively and were the equivalent of an over-wintered colony.

A. I. Root also started packing unassembled wooden hive parts for ease of shipment. What he did not realize was he was also controlling the transmission of American Foulbrood by shipping bees free of comb.

The major problem he never truly solved was what to feed the bees during transit. A bottle of water and candy worked well for a time and were used until cans of sugar syrup could be economically produced.

There is often a considerable weight loss during shipment, at least 1-7 ozs., and often more. If bees are full of honey when shipped, they will weigh less when they arrive. Careful shippers will overweigh the packages to compensate for this anticipated weight loss.Δ

6. Once all the bees are in (or you have gone onto the next package) reduce the entrance so the new package can guard their hive from robbers — you can also feed them with a Boardman Feeder if the temperature is over 60°F. Now leave your bees alone! For at least 5 days!



7. If the weather turns cold and rainy for the next five days, you may want to feed your bees a supplemental pollen. This will help stimulate brood rearing. Otherwise, the only thing you should do is to refill any empty syrup containers.

That's how it's done. The A. I. Root Co. and other bee suppliers have literature and pamphlets on installing packages. Also, your local bee dealers are usually knowledgeable beekeepers, as are members of local bee clubs. Take advantage of attending meetings or beginners' workshops.

Next — your first inspection. Δ

JOHNSON DOVETAILING EQUIPMENT
FOR THE BEEKEEPER'S SHOP
Write for details
CARL E. JOHNSON CO.
1557 Gregory Avenue
LINCOLN PARK, MICH 48146

QUEENS
Superior Wintering, Production and Gentleness
1989 SPRING PRICES
1 - 25 . . $7.50 25 - up $7.00
Fumidil Fed • Mite Free
Call or Write:
COPPER CREEK APIARIES
Rt. 2, Box 508, Superior, WI 54880
(715) 399-2662

Midwestern Italian Queens
1 10 $6.00 10 - up $5.50
RAY COLGAN
Rt. 1 • Versalles, IL 62378
(217) 225-3570

Carniolan and Golden Yellow Queens — $7.50. Apparently Mite Free. Package Bees on Request.
Lester Selph
2502 Winton Rd. • Durham, NC 27707
(919) 489-9561

New!

- Enjoy nearly 20 years of Richard Taylor's wit and wisdom in the world of bees, beekeeping and even beekeepers.
- The four seasonal chapters include such topics as —
  - The Taylor Principle — explained!
  - Production and harvesting and selling comb honey
  - Shook swarming
  - Setting up and running a roadside honey stand
  - The secret to the 'perfect' wax cube!
  - 164 pages, hardcover A collectors book for sure!

— Order Yours Today —

Only
$12.99
Cat. No. X45

Visa, MasterCard, DiscoverCard Accepted
THE A. I. ROOT CO.
1-800-BUY-ROOT

Menthol Permit Obtained

Tracheal Mite Update

Dr. Bill Wilson, of the USDA Weslaco, TX Honey Bee Research Lab, commented at length on the Tracheal mite studies currently under way, and offered observations on the changes it has brought to the industry. He was speaking at the American Honey Producers meeting in Little Rock Arkansas in early January.

When the mite was first discovered, several in the industry felt it would spread slowly, if at all, and that many areas in the U.S. would remain mite free for years.

"But it wasn't as simple as that", he said. "We didn't anticipate the huge, and in many cases devastating changes that would rapidly come to be", he said. "No one imagined the number of Florida queen breeders who would be out of business almost immediately, for a variety of reasons. This was a shock to most all of us," he added.

"And the disagreements that flared up between states, and even between beekeepers in the same state were incredible. But those mysterious die-offs in northern Florida, southeast Texas and even in Minnesota were all influenced by, or maybe even caused by mite infestations. Some cases have been absolutely devastating", he said.

He blamed the rapid spread primarily on the fact that the mite is so very difficult to find. "The best tests in the world aren't 100% accurate, and those states with inadequate or nonexistent testing facilities complicated an already confusing problem," he said.

As an example, he referred to the heavy pollinating areas of California, with the almond, alfalfa, berry and apple crops. "Most pollinators move several times each season to gain the greatest efficiency and return from each colony. There is lots of competition among, and between pollinators in those areas, and in some cases the colonies are incredibly close. As many as 8-10/acre. This leads to a high probability of drifting, and thus contamination."

He cited the predicament of one average sized pollinator who started the season with 5000 colonies. As the season progressed, and the number of colonies infected with mites began to rise, the number of useful units he had left steadily declined. Old bees would

fly out, and not return. Weak and dead colonies began to add up. When that occurred he would combine the weak ones to make one good unit. By the end of the season, he had only 3000 colonies left — a 40% loss.

When asked about solutions, he mentioned two acaricides, but stated that to date, Amitraz® (a product of Nor-Am Chemical) seemed best.

"However, the lion's share of our control work has been with menthol crystals. We've been getting good control in the southern Texas area, and are currently doing work in northern areas.

"The goal is to get the crystals to vaporize and have the bees breathe these vapors", he said. "We've found a few ways that deliver these vapors effectively," he added.

"The best has been to use a packet of screening material, with the mesh size small enough to keep the small crystals inside. The pellets available are excellent", he added, "however they vaporize a bit slower than the crystals and certainly add to the cost.

"When you have temperatures of 60°F or less these packets (which should contain 50g (1.8oz.) should be placed on the top bars. If the temperature is over 80°F, the packets should be on the bottom board. If you have them on the top when it's too warm outside you'll drive the bees right out of the hive", he said.

"It gets tricky when the temperature is between 60° and 80°F, it becomes trial and error. The size of the colonies, the condition of the equipment and other factors will dictate how the bees will react, and more importantly, how good it works. But, with at least two weeks exposure, with four even better, control should be pretty good."

What's in the future?

"Well", he said, "I envision a day when a beekeeper will be able to buy bees that are 80%, 90%, 99% or 100% mite free. Of course, the less the infestation, the greater the cost. Marketing may take on a whole new look in the next few years", he speculated. Δ

Editor's Note: *In early January menthol crystals received a Section 3 (common use) permit. Crystals or pellets can be purchased from several sources. The American Honey Producers are to be commended for their role in obtaining this permit. Specific instructions and recommendations are available from suppliers, and some extension offices.*

Control Tracheal Mites
MENTHOL CRYSTALS
from Mother Natures Best
TLC
..the Lebermuth Company
1-800-648-1123
1-219-233-7000 in Indiana
P. O. Box 4103
South Bend, IN 46624

HAWAIIAN QUEEN CO.
Star Route 21-A
Captain Cook, Hawaii 96704
808-328-2656

1-9	$7.00 ea.
10-99	$6.50 ea.
100 up	$6.00 ea.

Fresh queens available
Place your order today!

Beauty and the Bees

B. A. STRINGER

***Beauty And The Bees** is a series of articles that combines the best of two worlds. In this series we'll look at plants that are both attractive around the house, and functional in the apiary. But what's even better, bees find all of these plants productive for nectar, pollen or both. Beauty for you and your bees.*

English Laurel is not a laurel at all, in the botanical sense. Its name, *Prunus laurocerasus*, puts it in the stone fruit family and describes it as "laurel cherry", referring to the leaves and the fruit. A common evergreen hedge plant, English Laurel is in the same genus as peaches, plums, and both fruiting and ornamental cherries. All of these plants produce nectar and pollen which is very attractive to bees.

Although usually grown as a hedge, English Laurel is more easily grown as a tall, unclipped screen. Constant, laborious pruning is needed to keep hedges neat, as shearing results in ragged, damaged foliage. To avoid this time-consuming clipping, grow the shrub as a screen or a specimen tree.

The shining, bright green leaves have such a high gloss they look varnished year round. Apparently there are extra-floral nectaries on the undersides of the leaves which are attractive to bees especially when little else is available.

English Laurel as a hedge. It is much easier to let this grow as a tall screen.

Fluffy white spikes of fragrant flowers appear in late May and are intensively worked by bees for nectar and the high protein pollen. The abundant bloom attracts large numbers of insects, as well as providing a spectacular and sweet smelling display. Black fruits resembling cherries form dangling bunches in late summer.

English Laurel is native from southeast Europe to Iran, and is hardy in this country to about 10°F. It is an undemanding plant which will grow in almost any soil or situation. However, the shrub cannot tolerate high air pollution and will do poorly in these areas. In regions where summers are very hot, the plant may do better with some shade.

If you haven't room for a full-sized 30' English Laurel, and aren't too keen on pruning anyway, there are at least three dwarf forms available which may suit you better. 'Nana', 'Mt. Vernon' and 'Otto Luyken' grow only 4-6 feet tall and have correspondingly smaller leaves to match their stature. Mid-sized varieties of English Laurel, which are also hardier, include Schipka Laurel and Zabel laurel.

A closely related plant is the Portugal Laurel, *Prunus lusitanica*. Lusitania was the former name of Portugal, where this shrub is native. Because of its slower growth, this evergreen is more adaptable for use as a hedge. Pruning should be directed towards cutting individual shoots rather than shearing, but need not be done as often as that of English Laurel.

Leaves are shiny dark green. The cream-colored flower spikes, similar to those of English Laurel, protrude from the foliage, inviting bees to sample their nectar and pollen. Red to purple fruits form in long clusters in late summer. Once established, Portugal Laurel tolerates heat, sun, wind and drought better than does English Laurel.

When grown in shade, the shrub becomes looser and less compact. If a lot of pruning is necessary, the shrub will bear fewer flowers and fruit that season. Portugal laurel is an attractive free standing single- or multi-trunked tree, as well as valuable hedge material.

These species of *Prunus* may be grown from seeds sown in autumn or from cuttings. Also, young seedlings may be dug from nearby established plants and transplanted successfully with little trouble.

As screens, hedges or specimen trees, laurels enhance your landscape and attract honey bees. Δ

B.A. Stringer keeps bees, and writes about honey plants in Blodgett, OR.

Portugal Laurel in flower.

VARROA ADVANCES

Practical research and rapid progress was the varroa story at the American Beekeeping Federation meeting held in Indianapolis, IN in January. Dr. Shimanuki, from the Beltsville, MD Bee lab, and Dr. Frank Eishen, from WA, gave two sneak previews of what's happening now, and what's in the near future.

Dr. Shimanuki now has a quarantine facility at the Beltsville lab to be used to study varroa biology and biological control of varroa and other pests. A research scientist with an acarology (mite study) background has been transferred to Beltsville from a Georgia lab. This researcher recently spent time in Europe studying varroa, so has both an excellent background in this pest, and an outstanding new facility for further research.

Other areas of study at Beltsville include looking at controls other than those already in use, including chemicals that affect the mites' molting process. Also, there are strains of bees present in Europe that have been bred for varroa resistance, and the USDA and others are negotiating to import experimental samples of these strains. The reasons for this are several, as Dr. Shimanuki explains, "We don't want to have to reinvent the wheel again. And now, with this new quarantine facility, we have the capability to pick up where others have left off."

He went on that importations are still a ways in the future, and that the negotiations are still in progress.

Dr. Frank Eishen recently moved to Washington to begin work with Dr. Charles Milne on DNA study. However, Dr. Eishen's most recent work has been working with a varroa and tracheal mite treatment called Apitol (cymiazole). Apitol is a systemic compound, fed to bees in sugar solution. In studies in Mexico, colonies infested with tracheal mites at three different levels were treated with Apitol, and the preliminary results were astounding.

These results were repeated in studies in Florida. There, infested queen nucs were treated to see if the treatment affected mating behavior or fertility. Again, the results look promising.

Dr. S. M. Shehata, Technical Director with Zoecon Corp. spoke on the development and use of the three Apistan® strips. The 1% queen tab has now received a general use permit, meaning that anyone shipping queens this season will have access to this treatment if needed. The 2-1/2% package strip had not received a general use permit in late January, but one is expected in February. He also stated that they expected the 10% colony strip to receive a general use permit in April, but was less certain of that date.

Dr. Hack, from Nor-Am Chemical Co., discussed the development of Amitraz®, a chemical that has shown good effectiveness against both tracheal mites and varroa mites. Nor-Am's goal was to develop a treatment that was effective, safe for both bees and beekeeping and was not only easy to use, but so easy that misuse would be difficult. Further, they wanted it to be cost effective and as clean as possible.

So far, Nor-Am has developed both a plastic strip treatment to use in colonies and an aerosol treatment. The plastic strips, used three to a colony have shown no residue problems so far, and are comparable in cost the Zoecon product. The aerosol, a 10 second spray treatment has shown excellent tracheal control but not as well on varroa. Used at 7-10 day intervals a 94% control for tracheal mites has been reached.

Research, biological control, imports, chemicals — the picture is bright for varroa control. Δ

HONEY BEAR LABELS
Multi-Color
500= $25.00 & 1000= $38.00
add $4.00 for shipping & handling.
FREE *with each order.*
U.S.A./GRANULATION Labels they are *RED, WHITE* and *BLUE!!*
R. M. FARMS
Dept N
28760 Van Born Rd.
Westland, Michigan 48185
Ph. (313) 722-7727
For samples of all our labels just send $1.50
No charge for imprinting. Name & Address

389
Re-Subscribe NOW!
to . . . Gleanings in Bee Culture
• *Stay tuned to* Bee Culture *in '89* • *Commercial Beekeeping Explored* • *American Honey Plants* • *Gardening with Bees* • *Pollination Facts & Figures* • *More, much more for you in 1989 — Resubscribe NOW!* •
Please Renew
New Subscription
Send Sample
2 Years - $25.00 1 Year - $12.95
Plus $7.50 per year additional for foreign/Canada.
Name
Address
City State Zip
Please check one.
Visa
MasterCard
Discover
Find my enclosed check, or charge to my Credit Card.
Signature
Credit Card Expiration Date
Send remittance and form to:
Gleanings in Bee Culture
Subscription Department
P. O. Box 706
Medina, Ohio 44258

RESEARCH REVIEW

DR. ROGER A. MORSE

Cornell University • Ithaca, NY 14853

"Not all European honey bee races are present in the U.S."

Studies by Dr. Walter Sheppard of the USDA in Beltsville, MD, indicate that populations of European honey bees are more variable than are those in the U.S. This suggests that there are races and groups of honey bees in Europe that we do not have. It is now agreed by many people that we should make a strong search for bees resistant to chalkbrood, tracheal mites and varroa mites. Sheppard's data support the thought that we should be importing bees from Europe as part of that search.

The first bees brought into this country by the early British settlers were those from Northwest Europe. Since the importations were made by slow boat in the 1600's and 1700's it is likely that only a small percentage of the colonies survived the trip. When commercial beekeeping began in earnest in the U.S. in about 1870, about 20 years after Langstroth's discovery of bee space, the emphasis was on the importation of Italian bees.

There are records that six other races were imported on a limited basis, but only the Caucasian and Carniolan races gained any popularity and can be purchased in more or less pure form today. The rest of the races either were not imported, or if they were, were apparently lost over time. Sheppard says that the difficulty in moving bees here a few centuries ago created a serious "bottleneck" for the species and limited what we have today.

This information has been learned using a procedure that distinguishes among enzymes that differ very slightly. In some cases bee races can be differentiated by which form of an enzyme is present. The process, which is relatively new and strictly a laboratory operation, is slow and tedious but the results are exact and give us a great deal of information. The number of colonies that Dr. Sheppard has studied is small too, but the results agree quite well with those of others. Interestingly, it appears that the original race brought into North America by the early settlers has largely disappeared from among the commercial bees in use today. Enzymatic evidence of the influence of this race may be found, however, in feral colonies living wild in trees and buildings.

A second fact reported in this paper is that one of the enzyme forms thought to be specific to Africanized bees, and useful in their identification, occurs in European bees and is widespread in the U.S. Sheppard states, "Unless one is willing to concede that there has already been considerable 'Africanization' of commercial and feral bees throughout the United States, this allozyme cannot be considered diagnostic for bees with African ancestry." That statement is intriguing in many ways.

Last month I reported that a paper presented at the recent meeting of the Entomological Society of America indicated the varroa mites we have found in the U.S. probably came from South America, not Europe. That would suggest a recent importation of Africanized bees, in addition to those brought into the country in the early 1960's by Steve Taber, then with the USDA. All this gives us a great deal to think about.

Sheppard, W.S. Comparative study of enzyme polymorphism in United States and European honey bee populations. *Annals of the Entomological Society of America* 81: 886-889. 1988.

Sorry We're Late, Dr. Riley

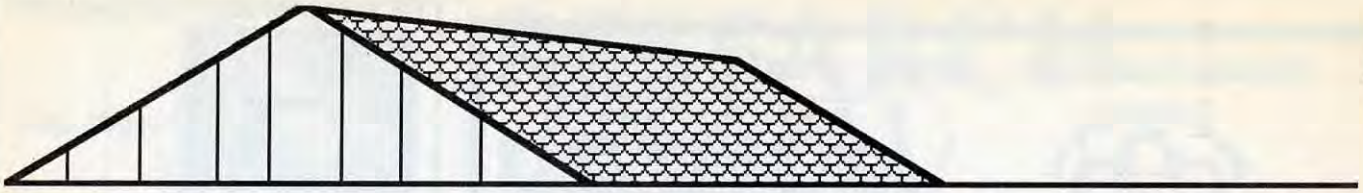
I enjoy wandering through the library and readings bits of this and that. Recently, I reviewed the address given by Dr. C.V Riley, well known federal entomologist, at the second meeting of the Association of Economic Entomologists in 1891. That organization is one of the parents of the current Entomological Society of America.

Under the heading of Apiculture, Riley said, "One of the most inviting fields is the search for and introduction of new varieties or species of bees . . There is every prospect of further improvement by the study and introduction of such promising races as are either known to occur or may be found in parts of Asia or Africa."

There is no question that since soon after the first settlers came to this continent Americans have been searching everywhere on earth for plants and animals that would prosper here and be of benefit to our agriculture. In fact, since the U.S. Department of Agriculture was founded that has been one of its chief goals. Along the way, sometimes as part of a purposeful introduction, we have brought in some that turned out to be pests. That is part of the risk one takes in order to make overall improvements.

African bees have, of course, been introduced into North America several times. However, those that will arrive this year or next do appear to be a little different for reasons that are not exactly clear. And, as Riley indicated a hundred years ago, we could gain from this introduction. Africanized bees have some virtues. So, like it or not, it is now up to us to capitalize on what is about the occur. It's just that we are late on picking up on Riley's advice. Δ

Riley, C.V. Presidential address. Proceedings of the Second Annual Meeting of the Association of Economic Entomologists. *Insect Life* 3: 198-199. 1891.



HOME HARMONY

ANN HARMAN
6511 Griffith Road • Laytonsville, MD 20879

March is a month of Lions and Lambs. At least that is the way March weather is supposed to behave, according to the old adage. No, I am not going to give you honey recipes for lions, but perhaps the lamb recipes will brighten those lion-like March days.

Some people flatly state they do not like lamb. The reasons given for this dislike seem to be remarkably consistent: lamb has a very strong flavor and lamb has too much fat. Perhaps we should have a look at both problems and ways of solving them.

Lamb is actually quite a versatile meat. It can be cooked in oven or microwave, barbecued on a grill, made into stews, and used in Chinese-style recipes such as "sweet-sour". Lamb can be substituted for beef or pork in many recipes. Marinades and basting sauces are very appropriate in lamb cookery.

Two items are useful in lamb cookery: a sharp knife and a rack. The sharp knife is for removal of both the thin paper-like skin that may be present on some cuts, notably the leg of lamb, and fat as much fat as you can possibly remove. The rack is used in roasting, to support the roast while letting fat drain away.

Microwave cooking is also very successful in removing fat from lamb being roasted. Here again, the meat should rest on a rack. Since microwave ovens vary considerably in power, follow directions that are supplied with your particular microwave.

Since the leg of lamb is a common item in supermarkets, and is large enough to serve a number of people, we can start with this cut.

First, as mentioned before, remove the papery skin, then trim away as much fat as possible. Now comes an interesting step. You are going to "butterfly" this leg. Don't panic — it is very easy. All it means is to remove the bone. The reason it is so easy on a lamb leg is that the bone is large and easy to get to. Place the meaty side down on your cutting board and, using your sharp knife, slice down to the bone. The only difficult parts will be around the joint ends of the bone. Pull the meat back with one hand and cut the meat where it is attached to the bone. Continue pulling and cutting and in a very few minutes you will have a bone with little bits of meat attached separate from a large piece of meat. You can use the bone for soup stock. The piece of lamb will look very strange. That is exactly what it is supposed to look like. It will indeed be somewhat flat with an irregular shape. It will slice quickly and beautifully at serving time. You can put some stuffing in, roll it back up, tie it together and roast it if you wish. However, here is a delicious honey recipe for it, unstuffed.

Marinated Butterflied Leg Of Lamb

1 leg of lamb, boned and butterflied
1 cup cider vinegar
1 cup cooking oil
1 tsp. salt
1/2 tsp. coarsely ground pepper
2 tsp. dry mustard
1 cup honey
1 large onion,
sliced and separated into rings

Place lamb in glass dish. Combine vinegar, oil, salt, pepper and mustard in 1-quart mixing bowl. Mix very well. Add honey and mix until well blended. Arrange onion slices over lamb. Pour marinade evenly over lamb and onions. Refrigerate for 24 hours, turning occasionally. Let lamb stand at room temperature for 1 hour before barbecuing. Grill over hot bed of coals for about 1 hour and 30 minutes or to desired doneness, basting occasionally with the marinade. Remove lamb from direct heat if dark crust is not desired. Place marinated onion slices in foil pouch; place on grill for 15 minutes before completion of cooking time for lamb. Yield 8 servings.

Nature's Golden Treasure
Honey Cookbook
Joe M. Parkhill

Shoulder or arm lamb chops have much more meat and less fat than rib or loin chops. However, trim shoulder chops well before using in the following recipe.

Baked Lamb Chops with Tomatoes and Cheese

4 lamb chops, cut about 1-inch thick or
8 chops about 1/2-inch thick
2 onions
1 can tomatoes
1/2 tsp. salt
1/4 tsp. pepper
1 tsp. honey
2 ounces grated cheese
1/2 cup breadcrumbs

Trim fat from chops. In flat baking dish put 4 chops in single layer, or 8 thin chops in double layer. Slice onion and layer on top of chops. Mix tomatoes, seasonings and honey. Pour on top of chops. Mix cheese and breadcrumbs and sprinkle over chops. Cover loosely and bake at 325° for 1 to 1-1/2 hours or until done. Cover can be removed during last 15 minutes of baking to brown topping.

The Book Of Meat Cookery
Mrs. Bee Nelson

Sugar available for feeding.
Granulated, in bags, bins or bulk. We cover the entire U.S.
42 and 55 Fructose now available
St. Charles Trading Inc.
1 (800) 336-1333
In MO (314) 625-1500

Although this next recipe was originally written for lamb shanks, I have used it for lamb chops with great success. The thinly sliced lemon is essential to the recipe.

Lamb with Honey and Spices

2 medium onions, thinly sliced
1 Tbls. butter
1 Tbls. olive oil or salad oil
1 clove garlic, minced or pressed
1 tsp. salt
1/2 tsp. turmeric
1/2 tsp. ginger
1/4 tsp. allspice
1/4 tsp. coriander
3/4 cup water
1/4 cup honey
2 cinnamon sticks
1 lemon, thinly sliced
4 to 6 thick lamb chops or 8 thin chops or 4 to 5 pounds shanks

Saute onions in butter and oil until limp but not browned. Mix in garlic, salt and spices. Simmer about 2 minutes. Mix in water, honey and cinnamon sticks. Bring to boiling and then remove from heat. Arrange chops in large deep casserole in single layer. Layer lemon slices on top. Pour sauce over chops. Cover and bake in 350° oven for about 1 to 2 hours, or until done. Remove chops to warm platter. Skim any fat from broth. Thicken broth slightly and pour over lamb.

(no source on this recipe — I have had it a very long time.)

This next recipe with the celery and tomatoes can be served with a nice hot bread for a complete meal.

Sweet and Sour Lamb

1/4 tsp. cumin seed ground
1/4 tsp. cardamom, ground
1 to 2 pounds cubed lamb (lamb chops can be used also)
salt and pepper to taste
1/2 cup water
1/4 cup sliced black olives
2 Tbls. chopped peanuts
1/8 tsp. paprika
1/2 green pepper, sliced
1 onion diced
3 Tbls. oil
2 Tbls. vinegar
2 Tbls. honey
2 Tbls. soy sauce
1 tsp. lemon juice
1 clove garlic, minced or pressed
4 Tbls. chopped celery
tomatoes, cut in 8 pieces each

Put oil in skillet, mix in cumin and cardamom and heat. Saute lamb cubes for a few minutes. Add onion, salt, pepper and water. Cover and cook 20 minutes. Add more water if needed. Mix vinegar, soy sauce, honey, lemon, garlic, and paprika and add to skillet. Mix well. Add rest of ingredients, mix and simmer until peppers are tender.

(no source on this recipe either)

And for those who know they love a roast leg of lamb, here is a simple recipe for a glaze.

Glaze For Lamb

1/4 cup honey
1/2 tsp. salt (optional)
1/4 cup prepared mustard
1/8 tsp. black pepper

Combine all ingredients. Spoon over lamb, reserving some for basting.

Nebraska's Honey Cookbook
Nebraska State Honey Producers Association

From these recipes you can see that lamb is truly a versatile meat. Enjoy it the year around. Δ

Note:
Please correct 1/2 cup flour in December, '88 Fruit Cake recipe to 1-1/2 cups flour.

PLAN NOW! Ann Harman will be in Medina, OH doing *"Cooking with Honey Demo's"* April 22 and 23. See next month for more detail.

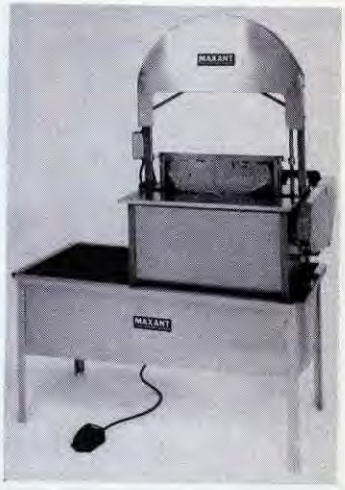
THE FOOD CHAMBER

When was the last time you sharpened your kitchen knives: paring knives, chopping knives, slicing knives? A wise kitchen gadget is a knife sharpener. Our wonderful stainless steel knives do not take a keen cutting edge readily, nor do they keep one. The old-fashioned steel ones do, but even these need to be kept sharpened. Get in the habit of keeping kitchen knives sharp. They are a joy to use. And a sharp knife is actually safer than a dull one that won't behave. How are your kitchen knives stored? All jumbled up in a drawer with big spoons and other kitchen utensils? No, a good sharp knife should be kept in a wooden holder. When the sharp blade rattles against other metal, such as a spoon, the edge will develop dull spots. Kitchen stores have nice wooden holders to protect your newly-sharpened blades. Δ

NEW! NEW! NEW!

Diamond 5000 Fully Motorized Uncapper

NO STEAM! • NO HEAT!
Fully Automatic 10 Second Cycle.
FOOT PEDAL CONTROLLED!
Both motors shut off at each cycle.
Available head only ($1,495.00) or complete with drain tray and basket to hold drain cappings ($1,895.00).
Write for more details.



MAXANT INDUSTRIES, INC.
P. O. Box 454G • Ayer, MA 01432

At $8.00 a pound, it pays to try . . .

COLLECTING POLLEN

PROF. MICHAEL ROLING

One late winter day while working at my desk, I could feel a student standing in the doorway of my office. No doubt some urgent question concerning class needed to be addressed. But this student was not in my classes. With no introduction he launched into a very familiar line, "I hear you keep bees."

My reaction is to gently settle back and get ready to politely listen to their family history in beekeeping. However, this time it was different. He wanted something: Pollen. He was a vegetarian: meaning, no meat, no dairy products. He had read that pollen had protein and vitamins and he wanted a local strain. Up to now I had never collected pollen, but when opportunity knocks, I like to answer. So a deal was struck; he would buy the pollen produced by three of my colonies.

Which Trap?

My first hurdle was to select a pollen trap. With no practical experience, the choice of traps was not clear-cut. After some reading and sifting through catalogues, traps were purchased that attached to the front of the hive (Figure 1). The trap's exterior surface was painted, but the interior with the wooden drawer, where pollen would be deposited, was left unpainted to prevent contamination of the pollen. This technique was followed with all traps purchased. The traps rested on the front entrance and were fastened to the lower brood chamber with nails. All hive entrances are not created equal, so cracks around the pollen traps were sealed with caulk.

Additional openings to the hive were closed, forcing the bees to use their new entrance through the pollen trap. The "L" shaped five mesh hardware cloth that actually strips the pollen from the bees as they enter the hive was raised for free flight and lowered for pollen collection using the circular knob on the right.

The first day the traps were used, all of ten pollen pellets were collected. The horizontal surface of the "L" shaped hardware cloth did not meet the eight mesh hardware cloth covering the collection drawer. This created a crack, allowing the bees to enter the hive undisturbed. The solution was obvious: bend the five mesh hardware cloth to close the opening. Once this was accomplished, nice piles of pollen were deposited in each trap.

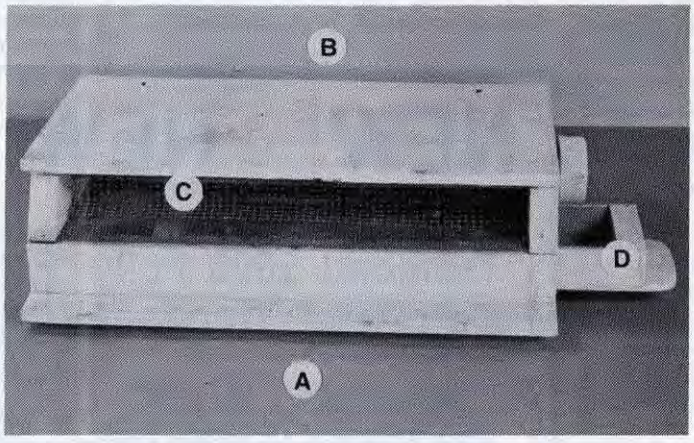


Figure 1. A) Front, B) Back, C) Pollen stripping device, D) Pollen drawer.

Two surprises were in store with the first rainy, windy day. The wooden pollen drawer was swollen shut and rain had dissolved the pollen pellets and produced a uniform layer of "pollen fudge" on the bottom of the drawer. There was no harvest that day, only a mess that needed cleaning. The next discovery was that numerous insects are attracted to pollen. Some were occasional visitors while others made the pollen drawer a regular habit. Ants were the most consistent problem. Finally, bees showered trash into the collection drawer, and every imaginable part of the bee was found there sooner or later. Legs and wings were especially common.

Even with the above problems in mind, these traps are suitable if you desire small quantities of pollen since they are easily manipulated with a little experience and are inexpensive. For greater quantities of pollen, other traps should be considered.

My pollen consumer was far ahead of my production, so in year two I shopped for new traps, looking for these specific qualities: better efficiency and better protection from insects, debris and rainy weather. The traps acquired to secure these qualities are shown in Figure 2.

These traps are positioned between the bottom board and the brood chambers. To strip the pollen loads they had two offset sheets of five mesh hardware cloth. This arrangement removed more of the pollen load returned to the hive. By pushing the insert containing the five mesh hardware cloth forward, the pollen stripping device was ready for action. By pulling the insert to the rear, free flight was allowed. The bottom of the pollen drawer consisted of plastic screen to

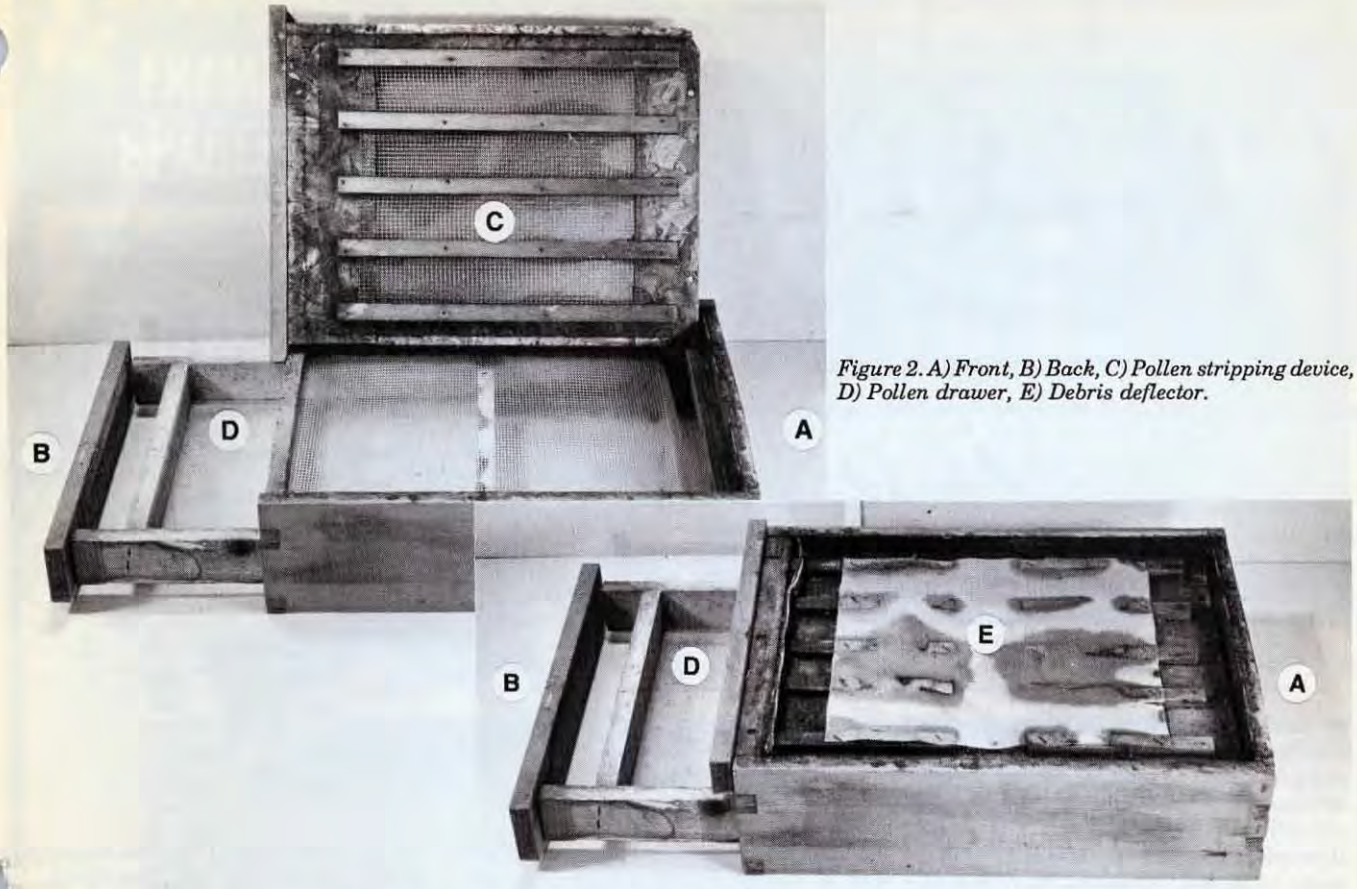


Figure 2. A) Front, B) Back, C) Pollen stripping device, D) Pollen drawer, E) Debris deflector.

allow air circulation, maintaining the pollen in excellent condition. The drawer was removed from the back so there was no interference with the normal flight pattern of the bees when collecting the pollen. This trap contained a very fine mesh plastic screen directly above the double layer five mesh hardware cloth. This screen kept some debris from reaching the collection drawer providing a cleaner product. Problems associated with this trap included ant invasions, the free-flight mechanism became sticky and difficult to engage, and the gasket at the back became sticky and subsequently bent so that bees were able to enter and leave without going through the front entrance.

By year number three, my initial visitor was not only a pollen consumer, he was a distributor — selling what he could not eat. Therefore, the trapping continued and I examined a third type of trap (Figure 3). This model replaced the bottom board and brood chambers were placed directly on the top of the trap. Pollen was stripped from the bees with a punched metal plate. The punched metal plate was connected to a stiff piece of wire extending out the front of the pollen trap. By pushing the wire back, the punched metal plate was engaged for pollen collection. If the wire was pulled forward, free flight occurred. The collection drawer had a plastic screen bottom and was removed from the side of the hive. This trap contained all the advantages of the previous trap, plus it provided the cleanest pollen.

Disadvantages included ant invasions and difficulty opening the drawer. The more weight that was piled on the hive, the more difficult it was to open the pollen drawer.

"I tried three different types of traps, each with advantages, and disadvantages."

Post Harvest Care

Pollen was trapped four or five days consecutively, then free flight was allowed for several days. Following this procedure throughout the year, despite different trap designs, I realized that just as there were major and minor nectar flows, there were major and minor pollen flows. The quantity of pollen increased and decreased with the season, weather and vigor and brood rearing conditions of the hive. Also, there were more different colored pollens produced than I had ever suspected. Some days, one type of pollen was deposited exclusively; other days, there were as many as twenty or twenty-five different types of pollen pellets. The flavor of these different pollens, much to my surprise, was quite varied, ranging all the way from mildly sweet to something similar to the smell of a newly mowed field of grass or alfalfa.

When pollen was trapped, it was removed daily, or every other day at the most, and immediately stored in a freezer. All pollen was sold in the frozen condition in the local market. This minimized handling versus drying the product. CAUTION: Pollen *must* be kept in a frozen condition until consumed or it *must* be thoroughly dried and kept dry until consumed. Impress this on your customers so no ill side effects are realized from poor handling and storage after your sale is made.

The single most labor intensive activity in this process is cleaning the pollen. All debris had to be removed before selling the pollen for human consumption. This was accomplished

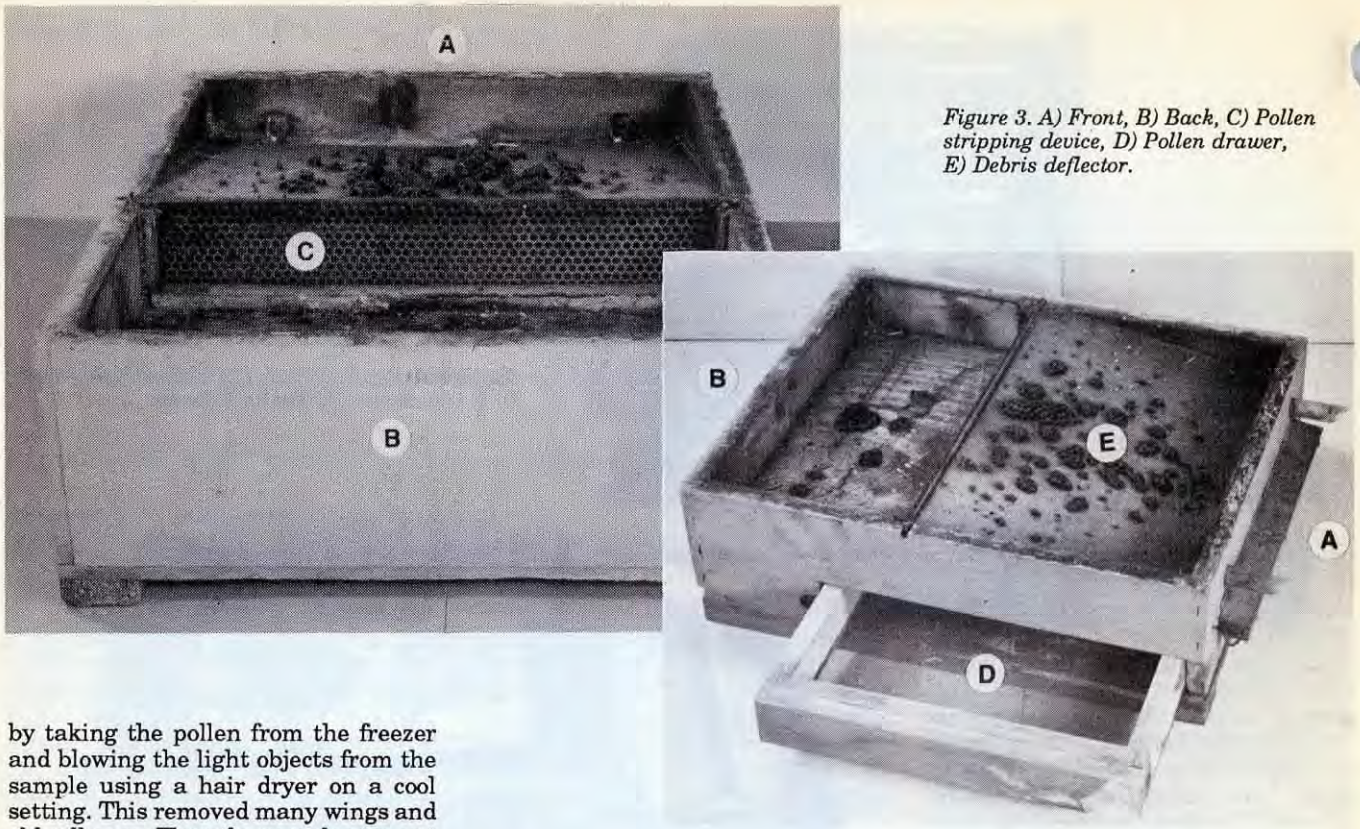


Figure 3. A) Front, B) Back, C) Pollen stripping device, D) Pollen drawer, E) Debris deflector.

by taking the pollen from the freezer and blowing the light objects from the sample using a hair dryer on a cool setting. This removed many wings and old cell caps. Then the sample was put through several screen sieves. The final stage required hand-picking of debris that was approximately the same size as the pollen pellets. As you acquire experience, you can quickly size up samples that contain too much trash and will take too long to clean to make the effort economically worthwhile. The cleaned pollen was placed in clear plastic bags and returned to the freezer. Once cleaned and sized uniformly, this colorful product, easily viewed through the clear plastic bag had excellent eye appeal for the consumer.

Marketing

What price will the market bear? Each of us has to determine the value of our time and what are local market conditions. I sold all pollen at $8.00/lb. At that price, I never had a complaint and all customers were repeat customers. Some indicated that in major metropolitan areas they had paid as much as $16.00/lb for fresh frozen pollen. Some areas may be sparsely populated and a market for this specialty product will not exist.

While the collection and sale of pollen has not replaced my primary goal of honey production, it did add some new monetary dimensions. Since the best pollen collecting usually occurs in the spring and early summer, which coincides with the best moisture conditions, the probability of crop failure is unlikely, practically insuring some annual income. Further, a cash flow is realized earlier in the year because the pollen harvest begins before the main nectar flow. While I believe maximum honey production was sacrificed, income from a colony producing both pollen and honey tends to be more reliable and the total income greater.

The Trap . . .

If you want more income from your hives, more knowledge about the natural history of your bees, and more color and flavor in your life, give pollen collection a try. It may accomplish one or all of the above — depending on your local market, your powers of observation, and your finely tuned taste buds. Δ

Michael Roling is an Agriculture Professor, beekeeper and pollen collector at Southwest MO State University in Springfield, MO. He teaches beekeeping, and practices what he teaches.

Goslings, Ducklings, Chicks, Guineas, Turkeys, Pheasants, Quail, Chukars, and Bantams. Equipment, Medications and Books.

CLEARVIEW HATCHERY
Box 399, Dept. AIR
Gratz, PA 17030

Farris Homan Bees & Queens
Alt. — Hwy. 45 South

Package bees, Italian or Caucasian, Inspected and free of Mites or other disease. Prepaid Postage & Insured.

In Lots of	Queens	2 lb. w/q	3 lb. w/q	4 lb. w/q
1-49	$5.50	$20.00	$25.00	$31.45
50 up	$5.00	$19.50	$24.50	$30.45

Clip or mark queen 50c per queen. Truck price quoted by request.
Shipments start April 15th.

FARRIS HOMAN
Post Office Box 4 SHANNON, MS 38868
Phone: 601-767-3960

BEE TALK

RICHARD TAYLOR

9374 Route 89, Trumansburg, NY 14886

"Bees and birds are important. Take a little time for both."

Almost every January we wake up one morning here to be greeted by a day that is like spring. The sun is warm, the snow is melting away, and if you look out to the apiary you see bees in the air. It seldom lasts more than one day, and then it is back to winter again, for the long wait until the real thing comes.

But on that one warm day I really feel the sap flowing in my system. There is nothing I can do with the bees, except think about them. But this year I indulged my passion for spring by getting in the car and driving off to a soil conservation office where I'd heard they were selling bluebird nesting boxes for four dollars and a half apiece. I bought twenty of them. I would have gotten another twenty if I didn't need the money for taxes this month. So anyway, that gives me thirty-two altogether, since I already had a dozen. I hang them on telephone poles, establishing a bluebird route, which I can check on either by car or by bicycle. I get other birds, too, especially tree swallows, but they are very beautiful and I am happy to find them in the boxes. The baby bluebirds are my real reward, however. Someday maybe I'll have a hundred boxes cut, or even two hundred, and then when I'm too old and feeble to do anything else, someone can drive me around my bluebird route, and I can rejoice in that.

What has that got to do with bees? Not much, really, except I do remember, over forty years ago, when I was thousands of miles from home and in a war, I was reading a book about bees. The author, (I think it was Frank Pellet) under the heading "Who May Keep Bees," said that a beekeeper should be a naturalist. He didn't mean that you have to be a professional naturalist, but only that you have to have a love for nature. And I believe that is true. There are many rewards in beekeeping. The most obvious is the honey crop. But there are others, even greater, and one is the sheer joy of seeing living wild things flourish. There is a beauty to a thriving apiary that is visible only to the eye of the lover of nature, and it is a reward which no price can measure. A nest of baby bluebirds is the same. How can anyone say what it is worth? To some, perhaps, nothing; a mere curiosity at most. To a lover of nature it is precious beyond description.

Well, in another month I'll have to start preparations for another season of comb honey, mostly getting supers ready. In the meantime it occurs to me that I might have some useful advice for new beekeepers — not the usual advice about how to assemble supers and how to prevent swarming, but something more general. My advice is cheap, and it may not be worth much, but here it is, for whatever it is worth.

First, then, don't invent a new bee hive. Many new beekeepers, as their enthusiasm mounts and they get to thinking more and more about bees, think they have a grand and revolutionary idea for a new bee hive, or perhaps a new super. But whatever your idea might be, chances are it has already been tried. The standard bee hives and supers we now have are just fine. Hives that are designed to encourage ever greater populations, or to enable two or more queens to live happily side by side, never pan out. There has, I think, been only one improvement in this area in the past fifty or even one hundred years, and that was the invention of the round section. That has absolutely revolutionized comb honey production. But all the dozens, or perhaps hundreds, of other "improvements" have gone the way of all crackpot ideas. So don't waste your time that way.

Second, don't fool around with new and fancy systems of management. There are certain tried and true management practices which every beekeeper should understand, but don't try to concoct a new one of your own. What is especially futile here is trying to get a system that will vastly increase hive population. Beekeepers think that the more bees they can get in their hives the more honey they are going to get. It isn't that simple. A colony of bees is rather like an organism, with its own internal balance and harmony. That balance can be seriously disrupted, so as to get monster hive populations, but one seldom gets correspondingly large honey crops that way. Almost every beekeeper, for instance, has tried hiving a swarm in a super then adding that super to an already strong colony, thinking he was then getting a colony with the strength of two. But what you find is that you get a big hive, but not a significantly bigger honey crop. Here, as in most things, there is a certain optimum, and if you go beyond it you are apt to defeat your purpose.

And finally, resist the temptation to write a book about bees, especially if what you have in mind is a manual of

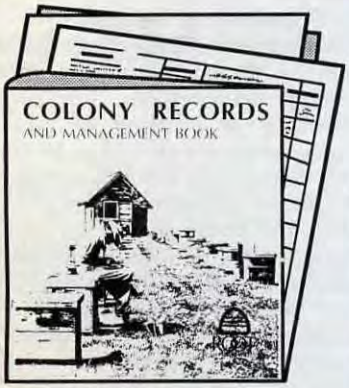
M. R. CARY CORPORATION
219 Washington Square • P. O. Box 122
Syracuse, NY 13208

A GOOD place to BUY
your Root Supplies,
Drums, Cans and Glass Jars.
Come to see us — or write —
or phone (315) 472-5487

beekeeping. Twenty years ago an able beekeeper with a gift for writing could write a manual of beekeeping with some success, but in the time since then so many such manuals have appeared that there is really not much new to be added. Of course if one has a good scientific background he can sometimes add genuinely new knowledge to the field of apiculture; but people like this are found in the science departments of universities, not in back lot apiaries.

Beginners always like to "play with the bees," as they say — to concoct new schemes. In fact I sometimes still find myself doing that. It is fairly harmless. But if your aim is just to be a successful beekeeper, to enjoy your bees as a part of your general love for nature, and to get fine honey crops, then I think the best approach is to work out a routine system of simple management, something that works well for you, and let it go at that. Δ

Questions and comments welcomed. Use Trumansburg address, above, and enclose a stamped envelope for a prompt response.



FINALLY!

A Record Book that keeps track of
EVERY
Beekeeping Activity.

THIS BOOK INCLUDES:
A sturdy, handsome, 3-ring notebook, 5 color tabs and a 2 sided, 50 sheet pad for Colony/Apiary Records — Colony ID, Medication, Queen Information, Bee Information, Equipment Notes, Harvest Data — PLUS — Room for daily activities, notes and reminders!

Also Available:
X38 — 50 sheet pad for Equipment Inventory and Supply Records
X52 — 50 sheet pad for Sales Purchase Records (perfect for taxes)
All 3 fit into the notebook for convenient, 1 place record keeping for ALL your Beekeeping Records.
X38 or X52 Only $4.99 ea. Postpaid

RECORD BOOK and MANAGEMENT SHEETS Cat. No. X22 Only $10.99 Postpaid

Better Beekeepers Know Where They Are Going . . . and . . . Where They Have Been. Get YOURS Today!

THE A. I. ROOT CO. • P. O. Box 706 Medina, Ohio 44258-0706 • 1-800-BUY-ROOT

CALVERT APIARIES
BETTER BRED QUEENS

CERTIFIED MITE FREE
PACKAGES POSTPAID

QUEENS		2 lb. w/queen	3 lb. w/queen
1 thru 24	$7.00	1 thru 3 $23.80	$28.50
25 thru 99	$6.00	4 or More $22.00	$26.50
100 or more	$5.60	Trucks $18.00	$23.00

Write or Call for 500 Queens or Packages

CALVERT APIARIES
P. O. Box 4
Calvert, Alabama 36513-0004

TELEPHONE
(205) 829-6183

$ $ $ $ $ $ $ $ $ $ $ $ $ $ $
Calvert Apiaries
$1.00 Off
OFFER GOOD WITH ANY $25.00 ORDER
COUPON MUST BE PRESENTED WITH INCOMING ORDER
1 COUPON PER CUSTOMER
Expires May, 1989

SPRING SPECIAL

Buy 2.0 Gram FUMIDIL-B @ $17.95 and get 1 lb. TERRA-BROOD MIX FREE

Buy 9.5 Gram FUMIDIL-B @ $52.00 and get 3-1/2 lbs. TERRA-BROOD MIX FREE

10 lb. Bag TERRA-BROOD MIX $10.00

25 lbs. Foundation
DURAGILT - $75.00
CRIMPWIRED - $75.00

ROSS ROUND EQUIPMENT
25% OFF
MANUFACTURERS LIST

FREE CATALOG

B & B Honey Farm
Rt. 2, Box 245
Houston, Minnesota 55943
(507) 896-3955

CANDLES

Increase your beeswax revenue 300% by having us handcraft your beeswax into beautiful candles. Four styles to choose from.

Hamm's Bee Farm
3857 Milky Way Road
Waukesha, WI 53186
414 549-1965

Buy the best.. visi-chek
ROSS ROUNDS
ROUND COMB SECTION EQUIPMENT
P.O. Box 485
Massillon, Ohio 44646
Telephone: 216-837-9778

Northern Queens
Honey Production Queens
1-5, $7.00 — 6-10, $6.00
11-25, $5.00 each

CERTIFIED
APPARENTLY MITE FREE

Queens available from our area from May 10 to August.

Scherer Bee *Schererville, IN 46375*
P. O. Box 461 *(219) 865-2898*

HONEY BEAR LABELS
500 - $27.50
1,000 - $49.00
Add $3.00 per 500 for Postage & Handling
FREE Imprinting But Space Is Limited
Other 2 & 3 Color Press-On Labels
Prices Subject to Change
Order Now and Save!!

CUSTOM LABELS
675 Daffodil Court
Oconomowoc, WI 53066
Information Only: (414) 567-0392

TESTING ANSWERS

From Page 153

1. **False.** The flavor of honey is not a category that judges place a great deal of emphasis on during the judging of liquid extracted honey. Most judges are only checking for off-flavors.
2. **True.** Round comb honey sections are not normally judged in the same class as basswood sections since it is easier to produce the round sections. Normally round sections have less uncapped cells since the corners in the regular comb honey sections, which the bees fill last are eliminated.
3. **False.** Even though wax moth larvae can damage the cappings on section comb honey, the damage would not be described as a series of tiny perforations in the cappings. Tiny perforations result from smoking bees when you are removing sections from the colony. When bees are smoked, they normally engorge on honey. If there are no open cells in the area to get honey from, the bees quickly make openings in the cappings large enough to insert their proboscis. Robber bees will also perforate cappings quickly.
4. **False.** In making mead, if the honey-water mixture is not boiled, a precipitate will form throughout the life of the beverage and will give it a cloudy appearance. This precipitate originates from proteins found in honey, not from the stage of fermentation.
5. **False.** Shrinkage and cracking in molded beeswax is an indication that the wax cooled too rapidly as it solidified. After liquid wax is placed in the mold, it is important to have conditions which will allow the mold and wax to cool very slowly.
6. B) 18.6% moisture
7. E) moisture content
8. A) All sections should be similar in appearance, the honey in each section should be similar in color and taste alike.
   B) Uniform cappings — the comb surface should be even and without indentations or areas which protrude.
   C) Absence of uncapped cells.
   D) Absence of soaked or watery cappings
   E) Cappings and section free of travel stain
   F) Freedom of pollen and granulation
   G) Uniformity of weight
9. Foam on a jar of honey is an indication that air has been incorporated during extraction, pumping, straining or bottling of honey. Honey strainers should be built so that honey does not drip or fall an excessive distance. During bottling, the honey should run down the side of the jar rather than being poured directly into the jar. The best way to remove small air bubbles from honey is to warm it gently and let it settle for several days.
10. The presence of lint, specks of dirt and sugar crystals.
11. A) Overheating
    B) Fermentation
    C) Undesirable plant sources
    D) Using smoke to drive bees from honey supers
    E) Improper use of chemical repellents to drive bees from honey supers.
12. A) Refractometer
    B) Polariscope
    C) Pfund Grader

ANSWERS TO EXTRA CREDIT QUESTIONS

13. C) Glucose-Oxidase
14. A) Invertase
15. B) Diastase (amylase)
16. E) Acid Phosphatase
17. D) Catalase

There were a possible 25 points in the test this month. Check the table below to determine how well you did. If you scored less than 12 points, do not be discouraged. Keep reading and studying — you will do better in the future.

Number of Points Correct
25-18 Excellent
17-15 Good
14-12 Fair

ITALIAN QUEENS — CELLS

EAST TEXAS BEE CO.
RT. 3 - BOX 104-B
BUNA, TX. 77612
409-994-2612
FUMIDIL-B TREATED

QUESTIONS?

-Q- *I have ten hives and want to increase them. They are all in two-story hives, each story being full-depth. Would this work: Early in May I insert an excluder between the two stories for a few days, then, leaving the parent colony (with the queen) on the original stand, set the other story on a new stand in the apiary and requeen it? I would then super the parent colony over an excluder, and super the other half after it had built up. In the fall I would leave a full-depth super on each colony, so as to again have my bees in two-story hives.*

David Bivin
Pendleton, KY

-A- That will work. Just be sure that the half which has the bulk of the honey remains with the parent colony on the original stand, for otherwise the bees will rob it out of the moved half and bring the honey back to where they think it belongs. Actually, if you don't wish to buy queens, you can let the moved half raise their own queen. That is certainly the easiest way to make increase: Just split the colonies in two and let the bees do the rest. Of course the queenless half will fall behind that way, but otherwise it works okay.

-Q- *How long can a queen be kept in her mailing cage before being introduced to a colony?*

Mase Miller, Sr.
Hamilton, MS

-A- I have kept queens in their mailing cages for over a week without harm. You must moisten the cage with a drop or two of water daily, to prevent dehydration. In a queenless nuc queens can be kept, several at a time, in their cages, almost indefinitely.

-Q- *I was late getting my honey off, and it granulated in the comb. The comb had been drawn from new foundation and I wanted to sell some of it as cut comb honey. Can it be reliquefied in a temperature-controlled warm box?*

John Finch
Sunbury, OH

-A- No. I'm afraid the only thing you can do with that honey is give it back to the bees. If you put the supers of granulated honey at the bottom of the hive, underneath the brood chamber, the bees will clean the combs out in the spring.

-Q- *An old beekeeper taught me that vinegar repels bees, and he uses it instead of smoke. He sprays himself and his clothing, and uses a fine mist of vinegar at the hive entrance, and the bees turn away from it and will not alight on him. Do you think it could be harmful to the bees?*

John Turner
Marianna, AR

-A- I have never tried this nor heard of it, but I cannot believe it would be harmful to the bees. A beekeeper I know uses a peppermint mist in the same way, and never uses a smoker. I personally like a smoker, not only because it is effective, but for the good smell of old burlap or rope, and I am sure this is harmless to bees if used sparingly.

Concerning goldenrod honey:
The question has been raised whether the pungent scent that arises, sometimes very strongly, from an apiary in the fall is due to goldenrod nectar, aster, or something else. Mr. Gervase Bauer, MN, believes it comes from tansey, but that seems doubtful to me, since tansey does not grow much here. Mr. Hershel Ramey, VA, thinks it cannot be from asters, as is widely believed, because there are none in his area. It seems to me that the most likely source is goldenrod, as I have long assumed.

Questions are welcomed. Address: Dr. Richard Taylor, 9374 Route 89, Trumansburg, NY, 14886, enclosing a stamped envelope for reply. No telephone calls, please.

ANSWERS!

Richard Taylor

The PERFECT Beginners Book on Beekeeping

ALL NEW Chapters include:

- Suddenly You're a Beekeeper
- Before You Start
- First Inspection
- Honey Flow
- Honey Plants
- Harvesting
- Management
- Packaging
- Social Skills

THE BEST THERE IS!

ONLY

$7.99

Order X84 **Postpaid**

1-800-BUY-ROOT

The A. I. Root Co.
P. O. Box 706
Medina, Ohio 44258

MasterCard, Visa and Discover Accepted.

GENTRY APIARIES
Fumidil-B fed Italian bees
Specializing in Early Queens
1989 Spring Prices
1-25...$5.00 26-99...$4.75
Call about prices over 100
Gentry Apiaries
P.O. Box 1032
Loxahatchee, FL 33470
(407) 686-2915

QUEENS
ITALIAN CAUCASIAN
Nice Large Queens
1-24 — $6.10 25-99 — $5.55
100-up — $5.35
Clip: 75¢ ea. Mark: 75¢ ea.
Order 1 or 1,000
MITCHELL'S APIARIES
Bunkie, LA 71322-0391
(318) 346-2176 or 346-4141

BEES & BEEKEEPING SUPPLIES
FREE Catalog

RUHL BEE SUPPLY
1424 N. E. 80th Avneue
Portland, Oregon 97213
Ed & Sheryl Johnson (503) 256-4231

"Practical Queen Rearing"
by Charles & Pauline Dublon
An easy-to-use, start-to-finish guide for raising your own queens, incorporating the JENTER method of Queen Production.
Now available in the U.S. for $15.95 postpaid from:
SILVER CITY PRESS
P. O. Box 1495 • Keene, NH 03431
or
WICWAS PRESS
P. O. Box 817 • Cheshire, CT 06410
CT. residents please add 7.5% sales tax.

Funny Beesness!

ROGER WELSCH

Whoops! Sorry I missed getting "Funny Beesness" into the last issue of *Gleanings*. I guess I must have nodded off there for a minute.

The bees may be taking it a little easy now that winter is here, but it appears from the mailbox that the beekeepers are still a-buzzing. I've been getting some good stories from you — in part, I suppose, because of my offer to exchange a book of tall tales for any story I use in "Funny Beesness." Well, that offer still stands, so send along your lies, tall tales, stories, anecdotes, fudge recipes, or income tax forms, and if I use them in print, I'll send along to you a copy of my latest effort, *The Liars Corner*.

Probably the most esoteric story of the season comes by way of Tahona Park, Maryland, from George Meyer, Jr. He maintains that he recently overheard a conversation between two bees who were on their way to a minor honey flow. The one was wearing a *yarmulke*, the distinctive Jewish skullcap. The other bee flew up alongside and asked, "Say, why are you wearing a *yarmulke*? You don't *look* Jewish?"

The other smiled and retorted, "I just don't want to be confused with a W.A.S.P."

Richard Crawford of Morrisonville, New York, says that the reason he likes to keep a work force of bees is that he has 65 hives and that means he can rightfully claim that he supervises almost 5 million employees and yet has virtually no labor problems. He goes on that his workers stay as busy as bees and work themselves to death.

I notice that Mr. Crawford doesn't make much of a point about the fact that all of his middle management employees and laborers are women and they stay out of his hair if he stays out of theirs, which just might account for the smooth way things run over at his place.

Robert Safrit of Concord, North Carolina, writes that in the south, they have a special way of telling if the harvest is good. After a hard day of removing honey they throw their bee suits up against the wall and if the suits stick and hang there, it's been a good harvest.

Mr. Safrit says that last summer the harvest was particularly good, which was surprising considering the general drought and resultant hard times across the country. But he thinks he has figured out why.

He writes, "While hauling straw on a hot day I sat down to rest in the shade on a bale of straw. I soon noticed two bees each carrying a piece of straw to a near-by spring. The water in that spring was polluted, so I wondered what they were up to, but then I saw them stick their straws into the water and pull clean water up from the bottom of that spring."

Now, that's a honey of a story!

Well, that's it for another issue of "Funny Beesness." I hope you enjoyed the stories sent in by your colleagues and I hope that you will be inspired to sit down and send along *your* favorite story for their enjoyment.

That's Roger Welsch, Primrose Farm, Dannebrog NE 68831-0160. Δ

THREE BANDED ITALIANS • PACKAGE BEES & QUEENS
Price includes postage/insurance, starting April 1, 1989. Fumidil-B fed to pkg. colonies and Queen Nucs. Mite Free & Health certificate furnished with all shipments.

Queens Only		2# w/Queen	3# w/Queen
1-4	$6.00	$20.50	$25.50
5-24	$5.75	$20.25	$25.00
25-49	$5.50	$19.25	$24.25
50-up	$5.25	$18.75	$23.75

Write or call for price on packages picked up at our Apiary or WE DELIVER.
$1.00 per package discount if order is paid in full by February 1st, 1989.
MILLRY BEE CO. Rt. 2, BOX 84 • MILLRY, AL 36558
(205) 846-2662 • (205) 846-2366

News, Comments . . .

• Money Matters

AGRICULTURE'S ECONOMY should rebound and grow in 1989 unless there's another drought, says Dennis Henderson, agricultural economist at Ohio State University. This welcome change from the down-sizing of most of the 1980's involves several factors, he says. The U.S. economy is entering its seventh consecutive year of real growth and the labor force is essentially fully employed. This makes domestic demand strong, particularly for well marketed products. Many foreign economies continue expanding which, with a weaker dollar, indicates good export demand for farm products. Moderate to strong prices will help keep cash receipts high but will be partially offset by lower government payments. Production expenses should increase 8 percent to 10 percent as the farm sector expansion aids allied industries.

HIGH-VALUE PRODUCTS are getting more interest as agricultural exports because of their economic impact, Dennis Henderson also reports. High-value products, or HVP's, are those valued above $500/ton and include products such as meats, fresh and processed fruits and vegetables, manufactured dairy products and other prepared ag products. Each $1 of HVP exports generates an additional $4 in economic activity in the United States, while $1 of bulk commodity exports only adds about 70 cents. In the past 10 years HVP's have jumped from about 33 percent of the value U.S. agricultural exports to about 45 percent. However, this is more of a return to the past than a new trend. HVP's were nearly half of U.S. agricultural exports before the boom in grain exports of the early 1970's. Still, the U.S. lags other exporters —HVP's account for roughly 80 percent of all world trade in agricultural products.

SOUTH KOREA is caught between a political rock and a hard place because of its trade surplus with the United States. Norman Rask, agricultural economist at Ohio State University, says American pressure on Korea to allow more imports of agricultural products is being violently resisted by the country's general population. Half of Korea's population was born in rural areas and strongly supports farmers. Korea is already America's third-largest export customer and could easily be a larger buyer if it relaxed restrictions to imports. Washington wants it to import more beef, oranges and other products including honey, but Korean politicians are keeping their constituents happy by continuing to restrict the country's markets. However, they run the risk of U.S. retribution on automobiles, electronics and other export goods.

• Speaking of Exports . . .

THE NATIONAL HONEY BOARD will host the first U.S. honey export sales seminar on March 30-31 in Nashville.

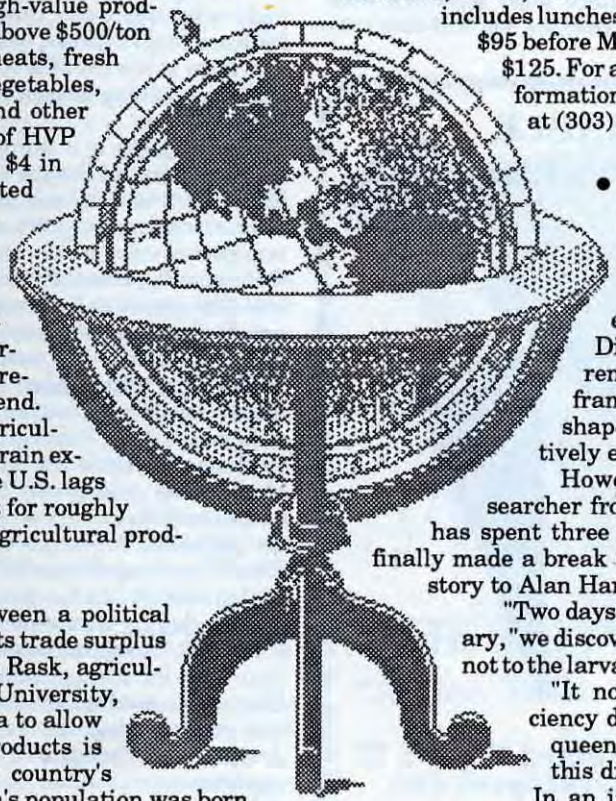
The seminar, designed for honey producers, packers and exporters, will focus on quality in product and packaging. Speakers will present information about target markets, resources for sales, and will address such essentials as letters of credit, foreign currencies, collections, legal issues and unfair trading practices.

The Honey Board is currently conducting research in three major U.S. honey export regions to learn the best techniques to market premium U.S. honey.

Roland Schiltz, International Agricultural Market Development Company (IAMDC), will present the market research results for West Germany. This country has an 82,000-metric-ton market and is the world's leading honey importer. The Middle East research report will be given by Saeed Masood, Arab Circle Marketing. The research results for Japan, which is experiencing a 15 percent yearly honey import growth, will be presented by Chris Coward and Tetsuya Takashima, Dentsu, Inc.

"The export sales seminar is designed to provide training and education so that the U.S. honey industry can reclaim its place in the world honey market," Dan Hall, National Honey Board manager said. "Armed with this information and determination, the industry could, in just a few years, raise exports from the current 3 percent of U.S. production to 15 percent, which is considered healthy for a specialty crop industry."

The seminar will be held at the Park Suites Hotel in Nashville, Tenn., March 30-31. The registration fee which includes lunches, breaks and meeting materials is $95 before March 15. After March 15 the fee is $125. For a registration packet with hotel information, call the National Honey Board at (303) 776-2337.



• Half Moon Disease Research

NEW ZEALAND bees, and beekeepers, suffer from a larval disease commonly called Half Moon Disorder. Although the cause has remained elusive, the end result is a frame full of dead larva, each in the shape of a half moon. Diagnosis is relatively easy.

However, Denis Anderson, a researcher from Auckland, New Zealand, who has spent three years studying the problem has finally made a break through, and gave this exclusive story to Alan Harman.

"Two days ago", said Anderson in mid January, "we discovered that the disorder was related not to the larva, but to prematurely aged queens.

"It now appears that a protein deficiency during certain critical stages in a queen's development ultimately lead to this disorder", Anderson said.

In an interview next month, Anderson will expand on his research, and the results.

• Sunflowers & Beekeepers

CONSERVATION MEANS different things to different people. But for farmers who operate in areas with limited topsoil prone to erosion, the word has additional significance. The 1985 farm bill included several conservation provisions

in an attempt to maintain fragile environments that are considered to be in the public interest. These provisions, better known as "sodbuster" and "swampbuster," created some "heartburn" for farmers and politicians. The other provision, the "conservation reserve," was well accepted, while the "compliance program for highly erodible land" is now drawing attention.

Under the compliance provision, the law requires that farmers wanting to continue federal farm program participation and benefits are required to develop a compliance plan for highly erodible land (HEL). That plan must be completed and filed with the Soil Conservation Service personnel at your local SCD office by December 31, 1989. Implementation of the plan must take place by December 31, 1994.

Some farmers have already completed and filed their conservation plans. Others have not begun to do so. However, it appears that farmers with HEL will need to prepare for some adjustments. In some cases it may simply require extending rotations, while in other situations it may require implementing another farming practice.

Farmers in the western portion of the sunflower-producing region, where erosion of limited topsoil can be a problem, will need to make adjustments in their farming practices to maintain a row crop like sunflower in the rotation. Since sunflowers can generally out-yield other crops on this type of land resource, there is an obvious interest on the part of farmers to keep the crop in their rotation.

This subject is important for farmers and beekeepers. As future farm programs are likely to be more flexible in cropping choices, growers will want to keep their options open. Taking advantage of a dynamic market for a certain crop in a particular year may well require good planning now. Farmers who do not have highly erodible soil will also have an interest in this subject as there will likely be more pressure on agriculture generally over the next 10 years to reduce erosion.

If you move bees into sunflowers each season, you need to know what those farmers are doing. They may move flowers in, or out of rotation as needed to comply with the rules. Also, they may be planting other crops that will produce well for your bees. It pays to check first.

OLD RELIABLE
Air Cooled Smokers from ROOT™

Your choice: **N-3, Standard 3-1/4" x 7"**
N-5, Jumbo 4" x 7"
Replacement fire chamber also available
for long life and a cool smoke.

Try one today!

Call your nearest **Root Dealer** or
call 1-800-BUY-ROOT

• Winter Windbreaks Start Now

THE EVERGREEN decorations of the holiday season have disappeared for another year. But you can enjoy evergreens year-round by planting conifers in your yard, garden and especially in your apiary.

Conifers vary in size, shape and texture, making their possibilities endless, says Randall Heiligmann, forester at Ohio State University.

Many conifer trees can be pruned for use as a hedge or to improve their form, Heiligmann says, and tips on these techniques are readily available in books and extension offices.

Most conifers should be planted on well-drained sites in full sun, although hemlocks prefer moister, shadier areas. Newly planted trees and shrubs may need regular watering for the first two years during the dry parts of the year. Mulching,especially, keeps them from drying out.

Plant trees at least eight feet from a house or structure, Heiligmann says. Keep the same distance between newly planted trees, unless you're looking for a dense, hedge-like growth. This is usually the case for wind breaks.

Heiligmann says conifer trees that can grow well for this include species of yew, pine, larch, spruce, hemlock, fir, dawn redwood, bald cypress, cedar and juniper.

Here is his list of several trees that are popular during both the holiday season and for their usefulness in other areas.

• **Scotch pine** is a European native, but has been widely used here. Its needles are sharp-pointed and slightly twisted. They're 1/2 to 3" long and blue-green or yellow-green. The bark on the upper part of the trunk turns an attractive orange-red color as the trees mature. It grows to about 50 feet, with the trunk 18" in diameter. Scotch pine is a hardy tree that grows well on most soils, except those that are very wet. It also tolerates street salt and high alkaline soils. There are some disease and pest problems with this tree.

• **Eastern white pine** is native to the eastern U.S. It's known for its soft, feathery, light-green foliage. The needles will grow 6" long. It can grow 100 feet tall, with a trunk 4 feet in diameter. Bark on older trees forms thin rectangular blocks. The tree grows best on well-drained soils; avoid excessively wet or dry sites. It's intolerant of street salt and air pollution. A fast grower, it can put on 4 feet per year. Proper pruning and shearing can improve the shape and use of this tree. It has few insect and disease problems.

• **Douglas fir** is a native of the western U.S. Its needles are 1 to 1 1/2 " long and stick out from all directions from the branches. Its cones grow 4" long and have attractive fringes. They make good smoker fuel. Douglas fir will grow 80 feet tall and the trunk from 12 - 18" in diameter. It does best on well-drained soils. Douglas fir doesn't grow well on full southern exposures.

• **Blue spruce** occurs naturally on mountain slopes in or near the Rocky Mountains but it's a popular ornamental and hedge plant in many parts of the nation. Its silvery blue, sharp, stiff needles are 1 -1/2" long. Blue spruce grows slowly after planting but can grow rapidly after several years. The tree can grow to 80 feet tall and 2 feet in diameter. Blue spruce grows best on moist, well-drained soil with moderate to good fertility. It's known for its ability to withstand drought and extreme temperatures.

• Old Farmer's Almanac

"Make Spider National Bug!"

AS A WAY to celebrate their centennial in 1989, the Entomological Society of America is suggesting that the United States designate an official national insect this year. We agree. The bald eagle is our bird. The rose is our flower. Time we had a bug.

Well, there seems to be a movement toward that end in Congress. Senator Larry Pressler of South Dakota and Rep. Stephen Neal of North Carolina, through separate resolutions in the Senate and the House, are nominating the honey bee.

We disagree.

The honey bee society is very different from our democratic society. Not only is each honey bee born into a strict caste system from which there is no chance for advancement, but honey bees exploit their workers, often deliberately starving them. Also, honey bee mothers routinely kill honey bee fathers right after they've make love, "royal" food is available to some privileged honey bees and not to others, and above all, honey bees murder their old queens. Now that's un-American.

So instead, we hereby nominate the spider. Even though it's not technically an insect, it could serve as our official national bug. The spider is a talented artist, a skillful architect, and a superb engineer all rolled into one.

(Ed. Note: I propose we let the Monarch, the spider and the honey bee fight it out — winner take all. Congress understands these things.)

• Honey Bee Stamp Creates Controversy

THE BUREAU of Engraving and Printing recently created a card of appreciation that is causing a bit of controversy in some circles.

Several months ago, when the 25 cent Honey Bee stamp was released, the BEP prepared an internal souvenir card for employees who worked on the printing job, as a means of recognition for a job well done.

The BEP routinely sends out letters of appreciation to employees. But the HB stamp was a particularly hard one to produce, so management decided to produce the cards as a special keepsake. The text of the card, titled "BEE'88" reads as follows:

"In commemoration of those employees of the Bureau of Engraving and Printing whose shear(sic) brilliance, dedication, steadfastness, innovativeness, and technical know-how made 'Project Honey bee' a success. The Bureau salutes you."

The illustration on the card shows three BEP employees valiantly battling to keep the bee in line on the stamp, with a group of people cheering below. This reflects the difficulty of the printing job known as insetting, which requires the use of two different presses to print one item.

The four color process cards were printed on the BEP's six-color Miller offset sheetfed press.

A BEP employee traveled, at his own expense, to Omaha, NB, where he purchased Honey Bee stamps that were then affixed to the cards and cancelled "First Day of Issue."

According to BEP sources, about 80 cards were produced and distributed to employees directly involved with the stamp production. Each card was hand cancelled, and no cards were distributed outside the BEP.

Because of the general unavailability of the cards, the market price for those that have surfaced is bout $100 each. Several people have called the BEP to complain, saying that distribution practices for the card were unfair, since the usual card supply sources aren't able to supply them.

One souvenir card enthusiast is concerned about the cost of designing and setting up a full-color printing job for just a few cards — even though he was quick to add that the BEP employees deserved special recognition.

The biggest concern seems to lie with the unwitting creation of a highly collectible item by the BEP and its similarity to standard souvenir cards.

However, BEP management stands behind its decision to produce and distribute the cards, because they were meant to be a special gesture for employees and were produced largely at personal expense.

• IBRA Selects New Director

DAVID FRANCIS started beekeeping as a schoolboy in Brecon, Wales, and has maintained his interest in apiculture throughout residence and extensive travels in Africa, Asia, the Americas, Europe, Scandinavia, USSR, Middle/Far East, the Caribbean, Australasia and the South Pacific.

After taking a B.Sc. Degree in Botany and Forestry at Bangor, he undertook postgraduate studies in aerial surveys for forest and land use at the Commonwealth Forestry Institute, Oxford, and at the Directorate of Overseas Surveys. He is a Fellow of the Institute of Chartered Foresters and Member of the Society of Tropical forester.

Mr. Francis intends, during his spell as Director of IBRA, to promote still further the international interchange of information of beekeeping, and to foster mutually beneficial apicultural research — bee breeding, pollination, management, as well as encouraging more beekeeping education and extension activities in Developed and Third World Countries.

THE BOTTOM LINE —

The Best Bottom Board in the Business, Bar NONE!

Ask for B12 (One) or B13 (Five's)

when ordering from your nearest Root Dealer

ROOT™

or call 1-800-BUY-ROOT

• Mussen Receives DSA

DR. ERIC MUSSEN, Extension Apiculturist at the University of CA, Davis, was presented the Distinguished Service Award by the CA State Beekeepers. He is a familiar face among beekeepers, frequently called on for consultation on beekeeping problems, and as a source of information on the latest development in bee research. He is always available to beekeepers whether it is the hobbyist with basic beekeeping questions or the large commercial operator dealing with new problems and or industry policy making.

Eric graduated from the University of MA in 1966 with a B.Sc. degree in Entomology and went on to study biological control at the University of MN. He completed a Masters degree and changed his area of interest to honey bees. Eric went on to be trained as an insect pathologist and studied sacbrood disease while earning his doctorate with Dr. Basil Furgala. After completing his degree, Eric worked as a Post Doc at the U of MN for several years. In 1976 he accepted the position as Extension Apiculturist at UC, Davis.

Eric works closely with the CA Dept of Food and Ag and the USDA, as well as the many beekeeping organizations in CA. He publishes a regular "From the UC Apiaries", keeps beekeepers informed on bee research, various activities, beekeeping classes, state of the industry regional problems as well as beekeeping tips. He also trains pest Control Advisors, serves as President of the American Association of Professional Apiculturists, is Sec./Treas. of the Northern CA Entomology Club and past President of WAS

• Other Awards, Elections

STAN NICOLAY receives "BS" Award from Tidewater Virginia Beekeepers Ass'n. The "BS" stands for Black Smoker, and the award-plaque consists of the silhouette of a jumbo smoker, black from constant use, appropriate wording, and enclosed in a suitably waxworm eaten frame. Art Halsted presents Mr. Nicolay the award at their annual Christmas meeting.

. . . & Events

☆ INTERNATIONAL ☆

The 32nd International Apicultural Congress (Apimondia) will be held in Rio de Janeiro, Brazil, October 22-28, Sunday-Saturday. The registration fee before May 20 is $150/principal, $125/spouse; afterwards, it is $180/150. It

ORANGE COUNTY, CA, Beekeepers Ass'n elects 1989 Royalty: Queen Antoinette Hiatt; Princess Becky Bruce; Jr. Princesses Elizabeth Hiatt, Catherine Hiatt, and Merlyn Valizquey. Kneeling is Jack Hiatt.

• Obituaries

PROFESSOR JOE M. PARKHILL died in January, 1989, after a brief illness.

He taught agriculture and apiculture for over 20 years and was director of the Apiary Dept. for the state of Arkansas for 18 of those years. He served as President of the Apiary Inspectors of America, and brought the World Wide 9th Pollination Congress to Arkansas. He also served as a Representative to the Apimondia Conference when it was in Russia.

Professor Parkhill was honored to present a paper on pollen at the International Conference on Apitherapy in Herzeiyz Ti Aviv, Israel in 1983. He served on the Board of Directors of the American Beekeepers Federation and the American Honey Producers.

Most recently, he was the head of the National Research Educational Institute on Nutrition of Pollen, Inc. He appeared on numerous TV & Radio programs promoting the value of pollen, and pollination.

He authored eight books on preventative medicine, nutrition, and cooking.

GORDON FREDERICK TOWNSEND, 74, professor emeritus of the University of Guelph and an internationally-known expert on beekeeping, died Dec 14, 1988.

He was instrumental in adapting sulfa to treat AFB during the Second World War and helped develop the Ontario Ag College honey pasteurizer and honey strainer (the OAC strainer).

Professor Townsend joined the Ontario Ag College in 1938 and served as head of the apiculture department from 1942 1971. He also served as Ontario's apiarist and was responsible for administering the Bees Act in Ontario.

He retired in 1980 but continued an active involvement with international development projects.

From Canadian Beekeeping

VLADIMER SHAPAREW, 64, of Oakville, Ontario died unexpectedly in Oct 1988. He was a valued contributor to the pages of many beekeeping journals over the past 10 years.

Born in Russia and educated in Canada, he was a nuclear scientist with AEC and with Ontario Hydro. He contributed much in beekeeping information and equipment development, including bee escapes, hive ventilators and other colony equipment.

From Canadian Beekeeping

THREE BANDED ITALIAN BEES AND QUEENS

Swarms shipped from Georgia

Shipments start late March or April 1st
(only by parcel post, UPS will not accept bees)
Clipping or marking — .40¢ each.

LIVE DELIVERY GUARANTEED

Queens
1-24 — $6.00
25-up — $5.75

Quantity	2# w/Queen	3# w/Queen
1-9	$19.50 each	$24.50 each
10-24	$19.25 each	$24.25 each
25-up	$19.00 each	$24.00 each

Plus Parcel Post and Special Handling.

WALTER T. KELLEY CO.
CLARKSON, KY. 42726 • USA

POLLEN SUBSTITUTE

Feed your bees Pollen Substitute early in the spring to stimulate brood rearing. However, be sure the bees have plenty of honey or they may starve before a honey flow. Especially valuable for early package bees received before natural pollen is available. This is a hi-nutrient, heat-treated soy flour, high protein, low in fat, moisture and fiber, with ample ash, carbohydrates and nitrogen solubility. This is a fluffy flour and can be easily blown by a light wind so it is far better to mix it with sugar syrup into a patty form which may be placed on treated paper or thin sheets of plastic directly over the cluster on the top bars.

Cat. No. 72 — 5# Pollen Substitute, Ship Wt. 7 lbs. — $3.00
Cat. No. 73 — 25# Pollen Substitute, Ship Wt. 27 lbs. — $12.00
Cat. No. 74 — 50# Pollen Substitute, Ship Wt. 55 lbs — $18.25

WRITE FOR FREE 1989 CATALOG

WALTER T. KELLEY CO.
CLARKSON, KY. 42726

Display Index