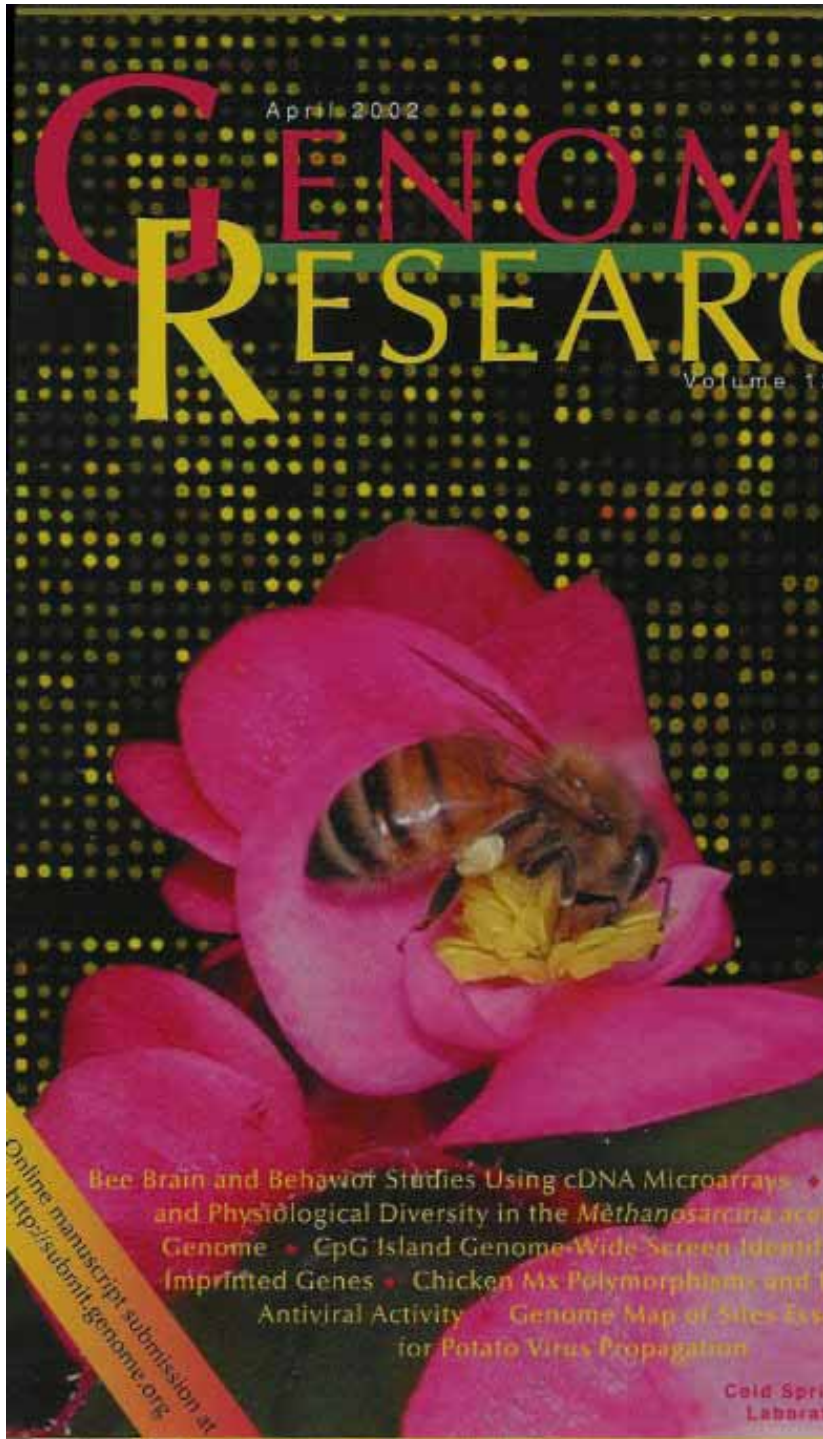


Digital Photography of honey bees



Zachary Huang, Entomology, MSU



December 14, 2004 | vol. 101 | no. 50 | pp. 17323-17566

PNA

Proceedings of the National Academy of Sciences of the United States of America

Pheromone exchange during honey bee worker feeding

4/2005

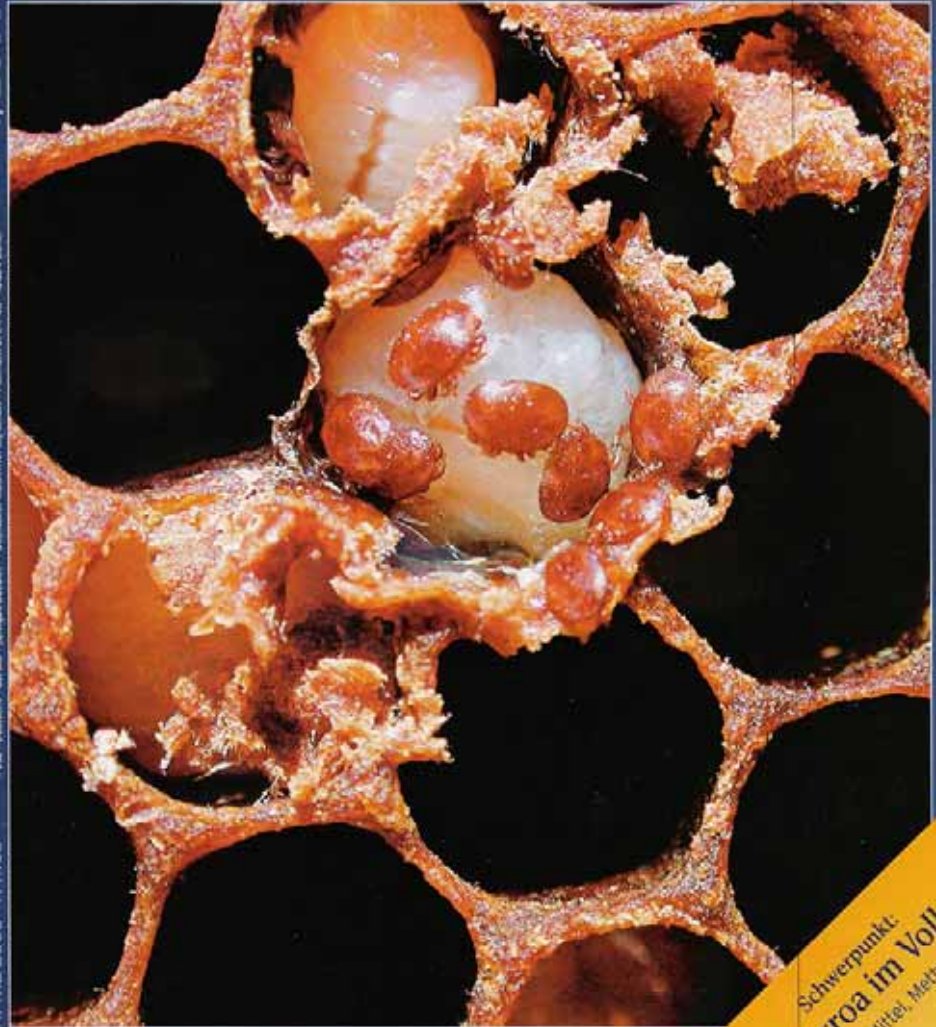
Controlling liquid crystal defect size
COX-2 inhibits prostaglandin degradation
3D structure of receptor/signaling complex
Fragile X syndrome and protein translocation

APRIL 2005 A 11165

ISSN: 0028-0742 (print) • ISSN: 1091-6464 (online) • © 2005 by the National Academy of Sciences

DEUTSCHES Bienen

JOURNAL Forum für Wissenschaft und Praxis



Schwerpunkte
Varroa im Volk
Mitteln, Methoden

My first digital camera (June, 1999, \$499)

Olympus D-450 Digital Camera

An update of the popular D-400 Zoom adds speed, improved color, and great low-light capability!

(Review first posted 18 October, 1999)



- *1.3 megapixels
- *3x optical zoom lens
- *Variable ISO, 160-640(!)
- *Excellent color & white balance
- *Exceptional low-light capability

EZ Print Link

Readers have requested free-formatted versions of our reviews (without the graphical accouterments of our page design), to make printing easier. We are accommodating this request with special copies of each review, formatted to allow the text flow to be dictated by the browser window. Click [here](#) for a print-optimized page.

Shutter delay=1 sec

Recording time: 4 sec

No control of exposure!

Has macro function but usually overexposed with flash

2nd: Nikon Coolpix 990 (\$720, 3.1 meg)



0.6 sec shutter delay

4 sec between shots

Control of exposure (P, A, S, M)

Control of flash power

Aperture range: 2.5 - 11

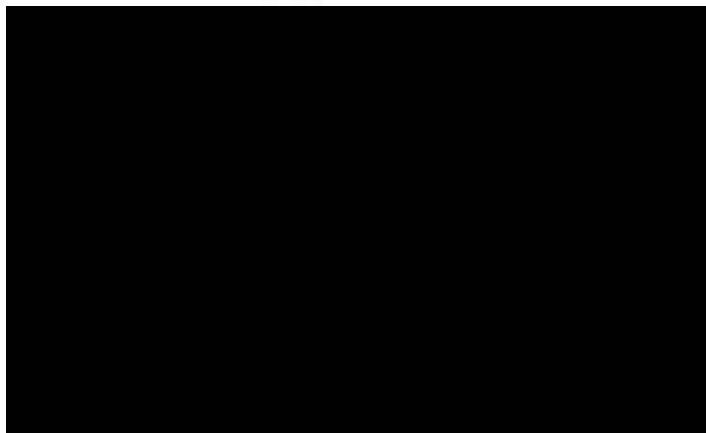
Shutter range: 8 sec to 1/1000

3/29/2004: Nikon D70 (SLR) (\$1000, 6 meg)



Very short shutter delay (60 ms)
3 frames per second!
Total control of exposure
TTL onboard flash
Interchangeable lenses

Aperture: lens-dependent (1.4 to 32)
Shutter: 30 sec to 1/8000



Camera-side

1. Get to know your camera (before you buy)
2. Really get to know it when you've got it
3. Take lots of photos
4. Study them
5. Look at other's photos (dpreview.com/forums) and discussions

Photos from D450: difficult to catch bees on flowers

Olympus D-450 Digital Camera

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A bee on Dianthus
1/294, F12.5,
3/22/00

A bee on poppy
1/294, F12.5
3/22/00



Photos by CP 990



Tricky to get flying bees (0.6 sec delay)
ok for in-hive shots.

1. Proximity of flowers and bees

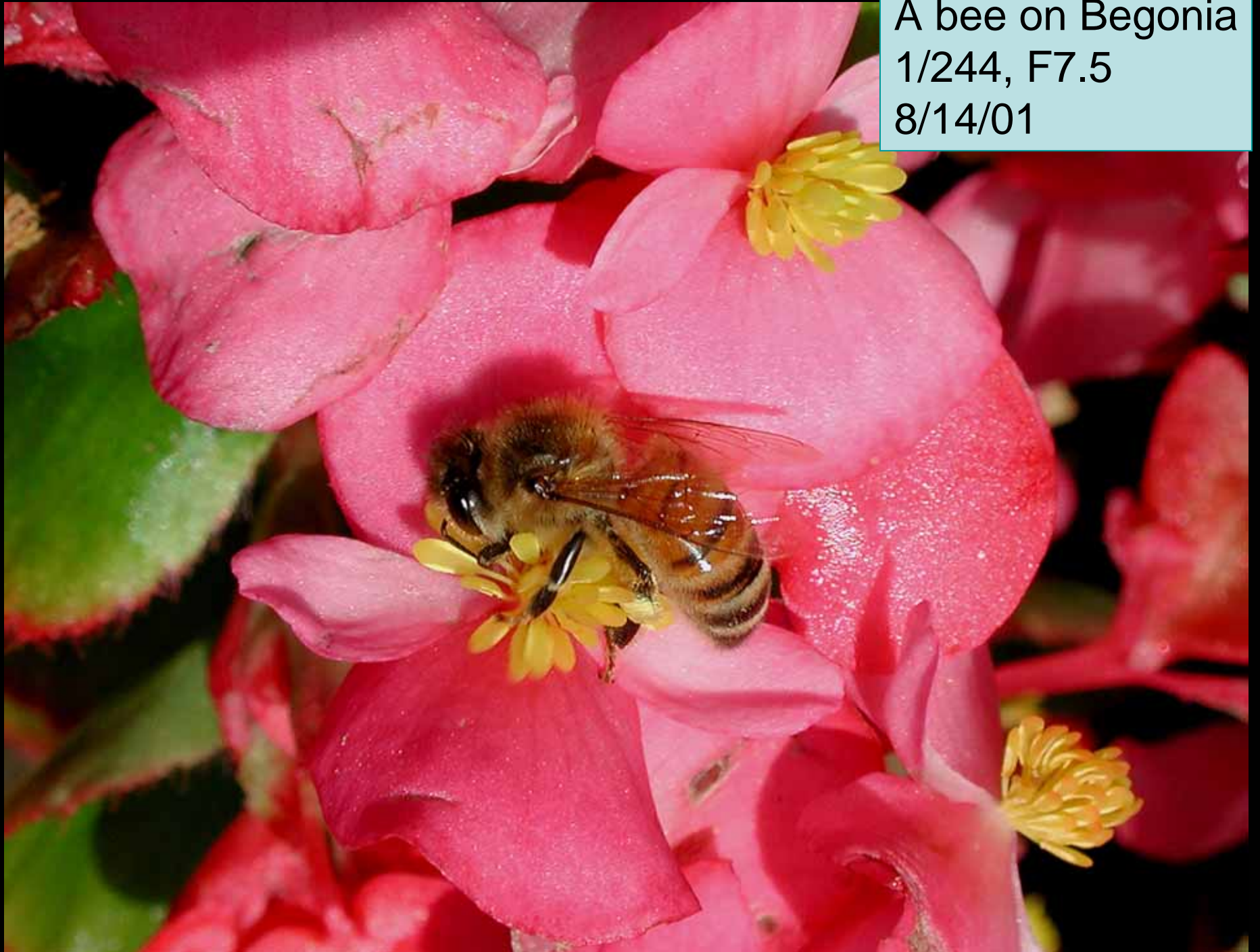




2. Sideviews of bees look better



A bee on Begonia
1/244, F7.5
8/14/01







3. Pay attention to lighting



4. Patience: wait for the bee to come.

A bee on waterlily
1/90, F5
4/21/02



5. Prepared: always have your camera ready



6. Luck: we all need it sometime

A bee on hyacinth:
1/280, F6.2, flash
3/26/02



6. Luck: we all need it sometime



A bee on Bombacaceae:
1/1000, F2.5
4/5/02





D70 + 60 mm Macro
Adequate for most instances
Wish focusing is faster
DX2: 12 meg, 5fps, but \$5,000.

Photography Basics:

Light/exposure:

Shutter speed: shorter duration = less light

Aperture (F): smaller (larger number) = less light

Flash: Add/replace sun light

Depth of field

smaller aperture = larger depth of field

Color

rarely controlled for digital but can use software

white balance is important

Composition

1/3 rule for artistic shots

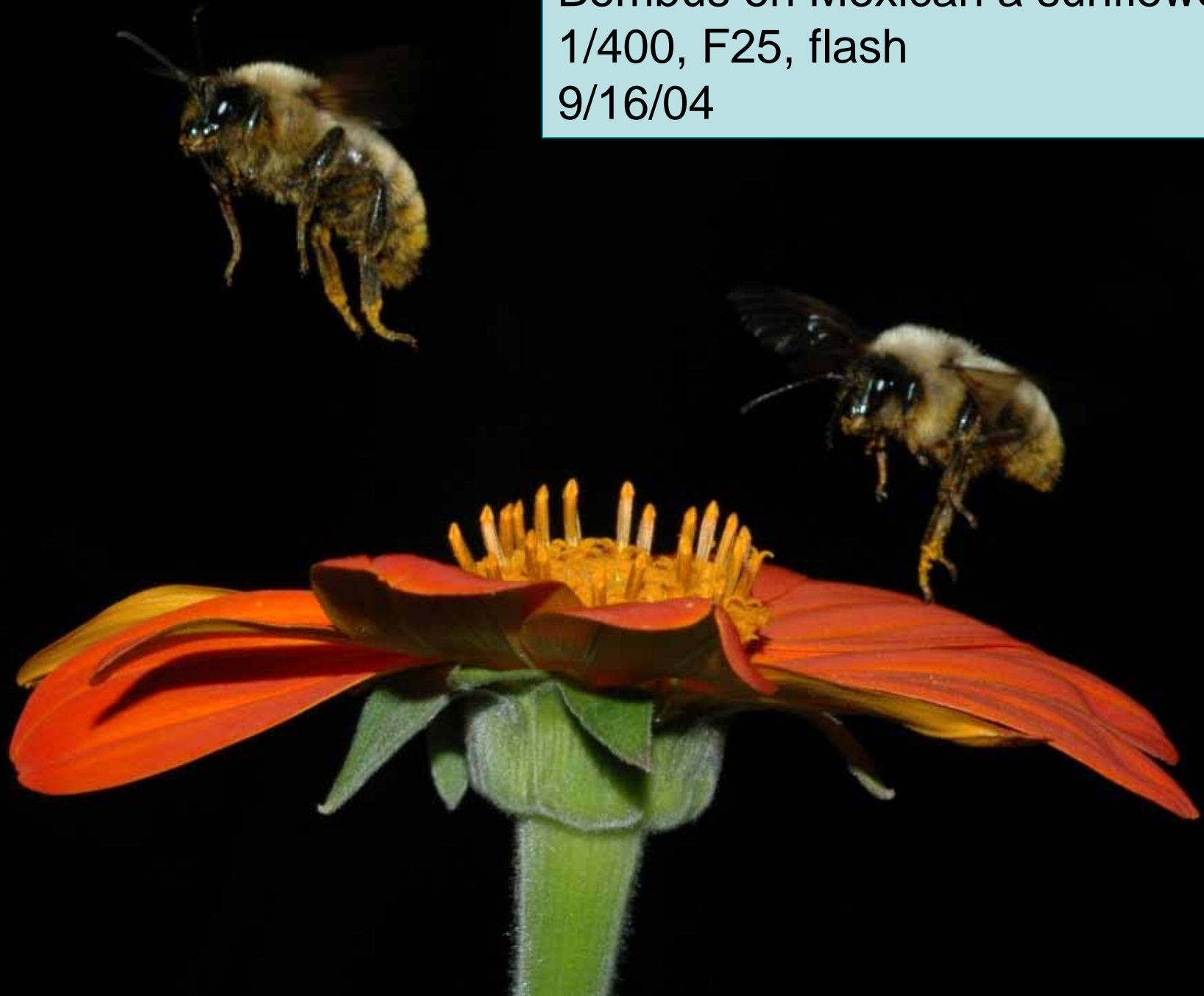
A bee on a daliah:
1/250, F3.3,
9/11/04



A bee on daliah:
1/500, F22, flash
9/11/04



Bombus on Mexican a sunflower:
1/400, F25, flash
9/16/04



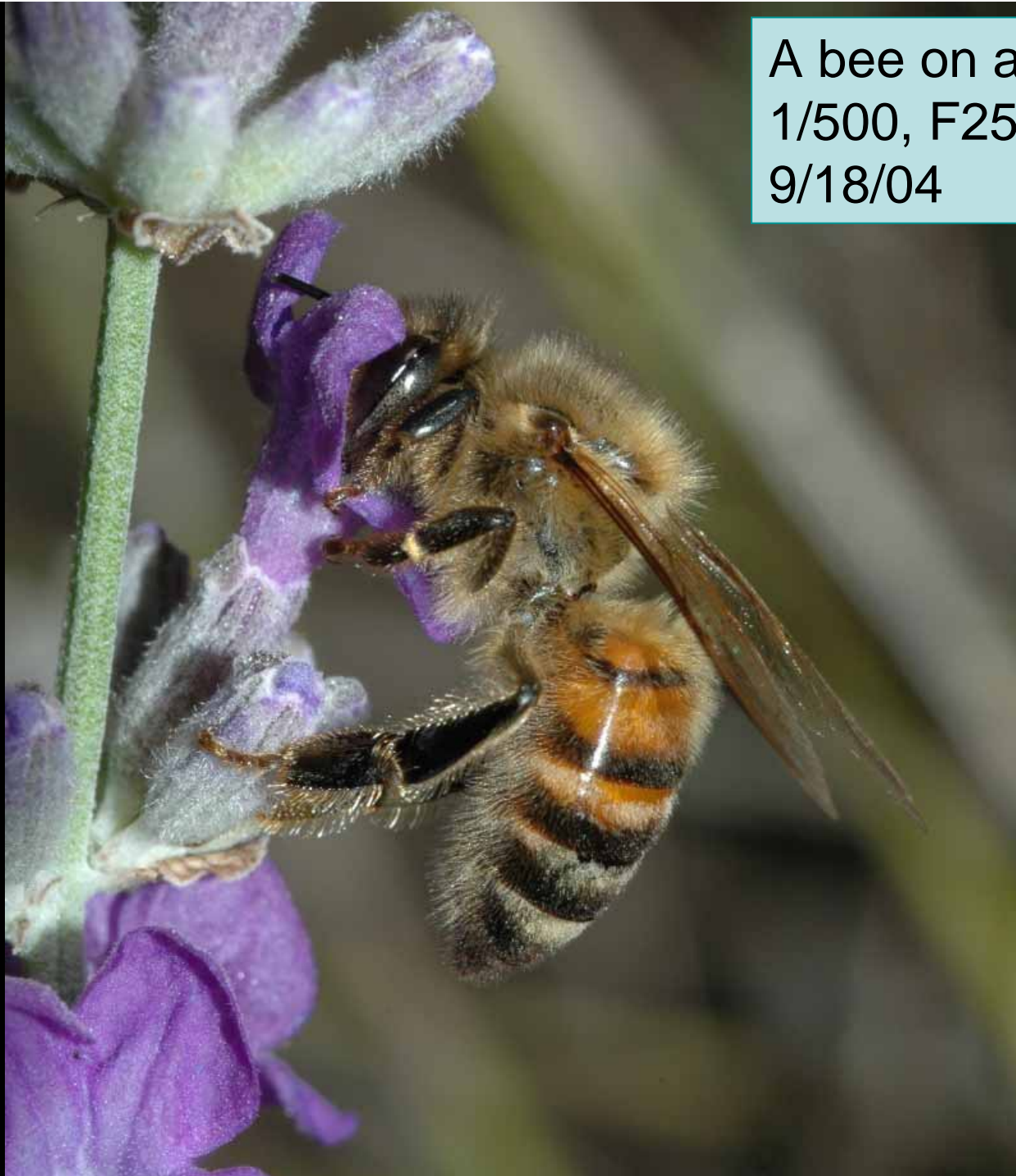
A bee flying to a Simpson's honey plant
1/500, F22, flash
7/7/04



A bee on stonecrop
1/500, F25, flash
9/18/04



A bee on a lavender:
1/500, F25, flash
9/18/04



A bee on Ageratum
1/500, F22, flash
9/19/04



A bee on goldenrod
1/500, F22, flash
10/1/04



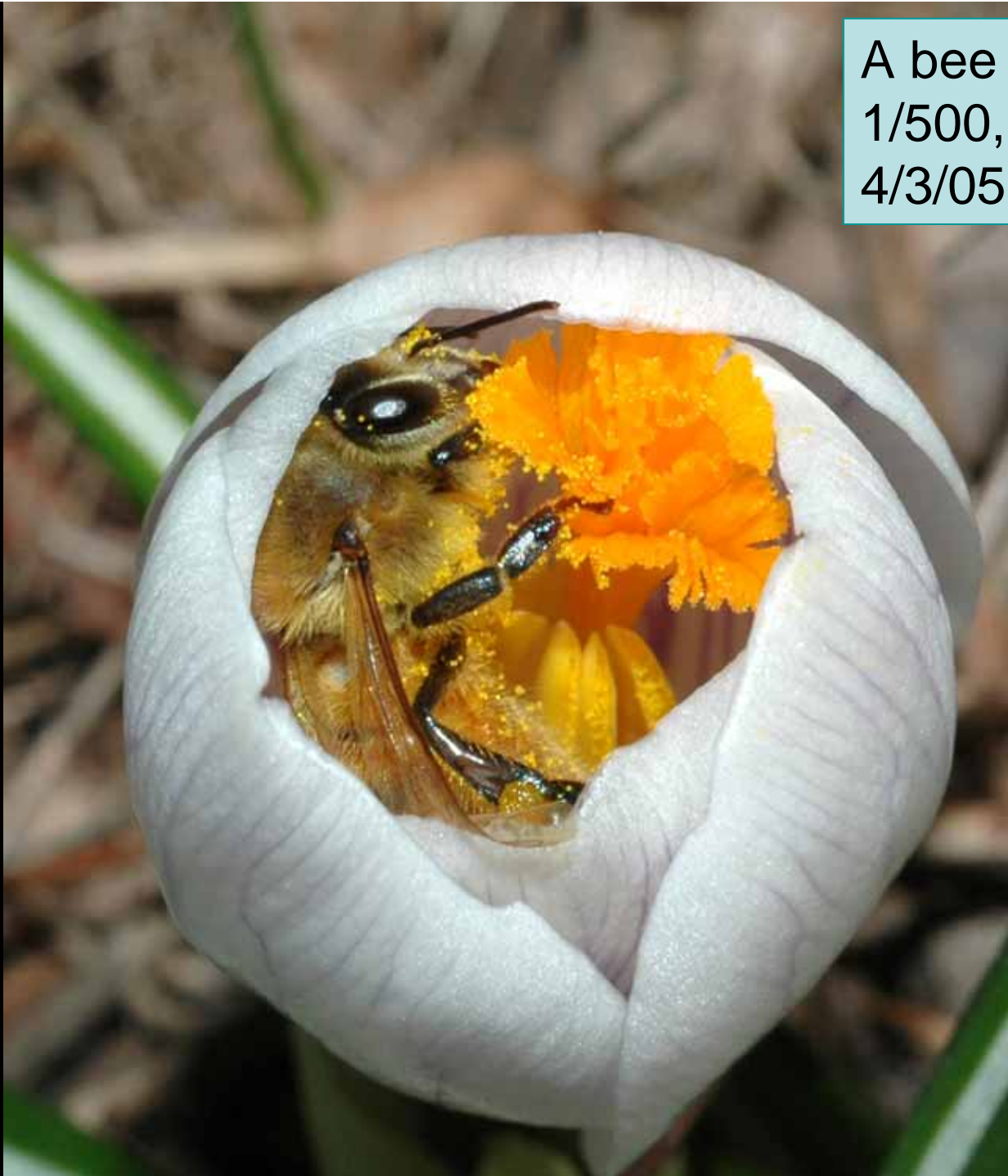
A bee on asters
1/320, F25, flash
10/14/04



A bee on napa:
1/500, F32, flash
11/7/04



A bee inside a crocus
1/500, F22
4/3/05



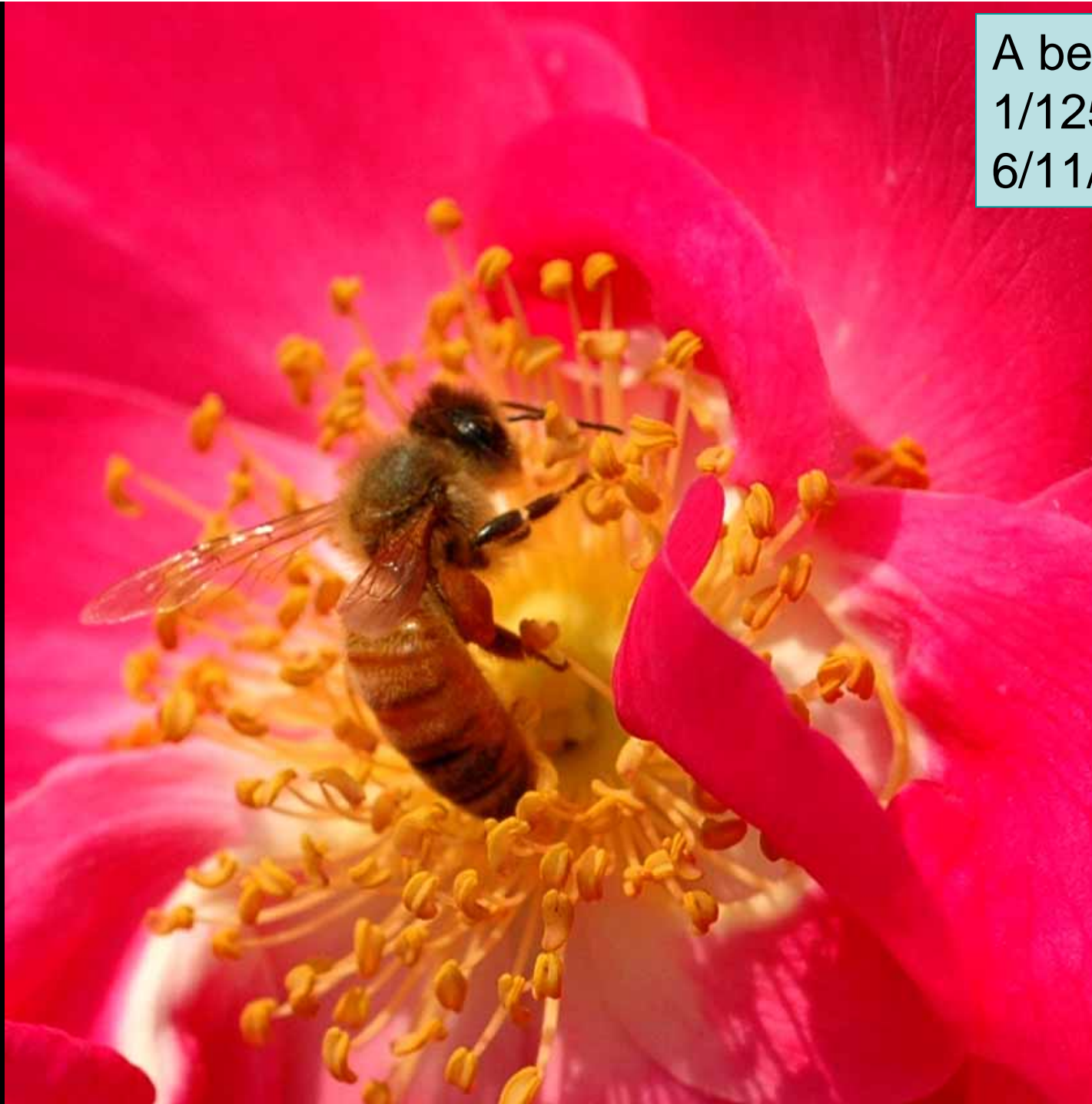
A bee on a crocus
1/500, F22
4/3/05



A bee on Scilla
1/500, F22
4/5/05



A bee on a rose
1/1250, F7.1
6/11/05



A bee in flight:
1/500, F22, flash
6/29/05



A bee on spiderwort
1/500, F5.6
6/18/05



A bee on basswood:
1/500, F22, flash
6/29/05

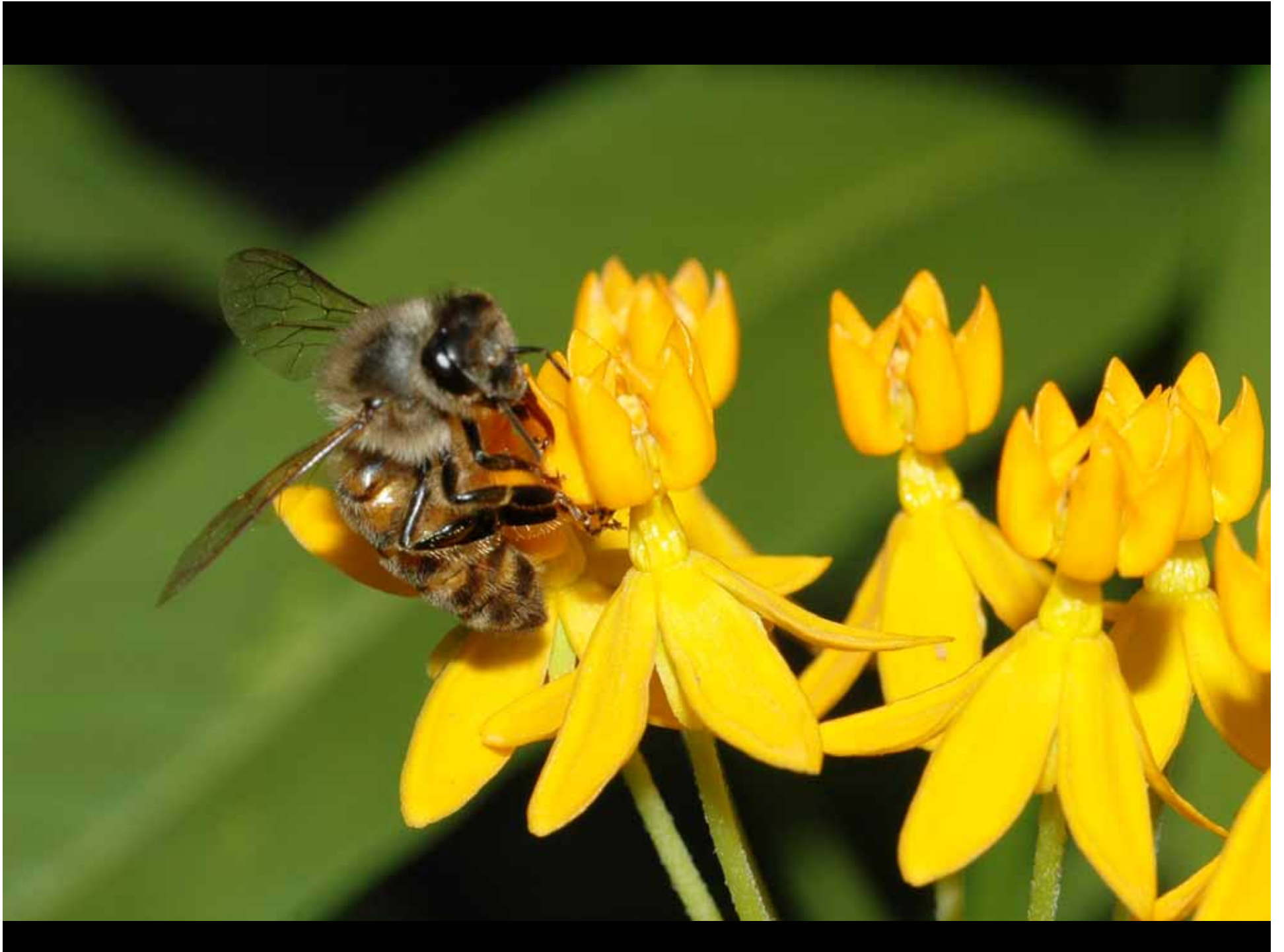


A bee on bird's foot trefoil
1/500, F22, flash
6/18/05



A bee on sweat pea
1/400, F13, flash
7/3/05





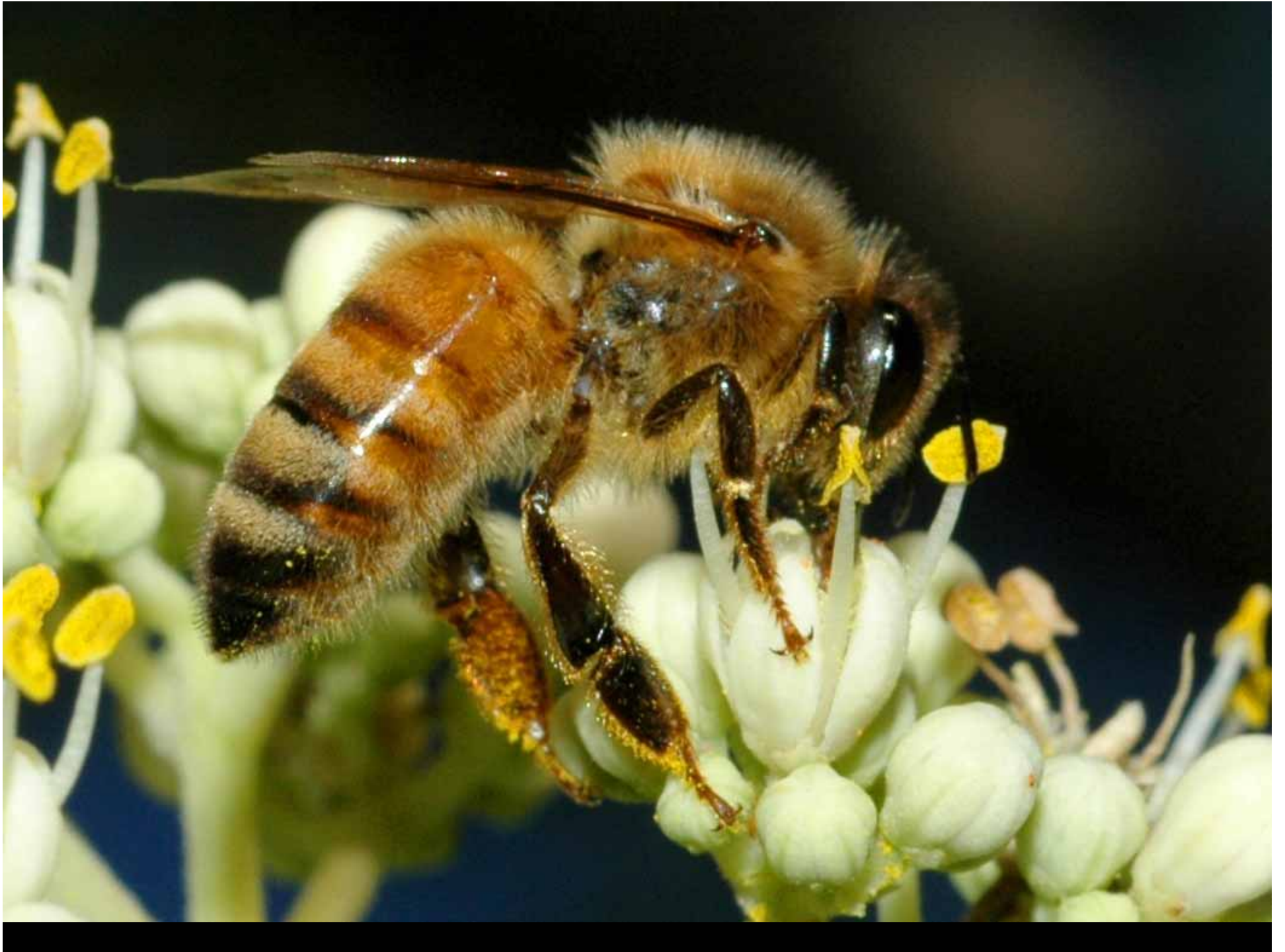






A bee on bee bee tree
Edwardsville
1/500, F22, flash
7/9/05, 5:25 pm





A cicada-killer in air
Missouri Botanic Garden
1/500, F9
7/8/05



Last, but the most important:
Passion for bees!

www.cyberbee.net

Photo.bees.net/gallery

bees@msu.edu

www.beetography.com

Melissa

