BANANA PESTICIDE UPDATE
HBIA CONFERENCE - 2006

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Dept. of Plant and Environmental Protection Sciences
College of Tropical Agriculture & Human Resources
University of Hawaii
TRY USING HPIRS
(Hawaii Pesticide Information Retrieval System)

- http://pesticides.hawaii.edu/
  - References HDOA pesticide licensing database.
  - Up-to-date.
  - Does not include 24(c) registrations.
  - Need to “sift” through the products and/or modify search criteria.
    - “ornamental” crops
    - nonbearing uses
  - Still need to read the label.
Plant and Environmental Protection Sciences
College of Tropical Agriculture and Human Resources
University of Hawai‘i at Mānoa

Extension

Extension Programs

New Pest Advisory
Information on new pests and diseases that have become established in Hawaii.

Extension Entomology & CTAHR Integrated Pest Management Program
Addresses specific problems related to household or agricultural pests

Extension Pesticide Program
Pesticide Risk Reduction Education Program, Hawaii Special Local Need Registrations, HPIRS, IR-4, APPMIN

Hawaii Pesticide Information Retrieval System (HPIRS)
An index to agricultural-use pesticide labels licensed for sale in Hawaii by the Hawaii State DOA

Statewide IPM Program
UH IPM Verification Program, UH CTAHR Extension IPM educational programs, UH IPM computer based educational material, UH CTAHR Extension IPM projects

HAW-FLYPM Statewide Extension Education Program
Statewide Area Wide Fruit Fly IPM Extension Program

CTAHR Noni website
Answers many questions regarding botany, natural habitats, horticulture & production, harvesting &
Pesticide Risk Reduction Education Program for Hawaii

- Training schedule
- Study packets
- Newsletter

List of current Hawaii Special Local Need registered pesticides
(View Hawaii Dept. of Agriculture’s web page for “Licensed Pesticides”.
Then click on the 3rd link near top center of the page.)

What is a “Special Local Need” registration (labeling)?

→ Hawaii Pesticide Information Retrieval System (HPIRS)

Pesticide Registration Program (IR-4)
Hawaii Pesticide Product Data

8012 Products Registered

Select and Submit Search Option:
- Active Ingredient
- Site of Application
- Pest to be Controlled
- EPA Registration Number
- Product Name
- Company Name

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Powered by the National Pesticide Information Retrieval System, Purdue University, West Lafayette, IN 47906
Site of Application Search

Name of plant, animal, object, site, environment, or structure where pest is causing harm:

Submit Site Keywords

OR Select from the following sites in Hawaii where pests frequently cause harm:

- ALFALFA
- ANIMAL PENS
- ANTHURIUM
- AVOCADO
- BANANA
- BARNs
- BASIL
- BEAN ROOT YAM
- BEANS (ALL OR UNSPECIFIED)
- BEANS, BUSH
- BEANS, GREEN OR SNAP
- BEANS, POLE
- BEANS, YARD LONG
- BEEF CATTLE
- BEET TOPS
- BEETS (ROOT OR UNSPECIFIED)
- BIRD OF PARADISE
Site List

Check Sites to be Included in Search

CHECK ALL  UNCHECK ALL  Submit Choices

- BANANAS
- ETHIOPIA BANANA (FOLIAR TREATMENT)
- BANANA (ORNAMENTAL) (FOLIAR TREATMENT)

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## Pesticides for Sale in Hawaii for Year Ending December 31, 2006

Number of Products Selected: 239

OR Display either summarized Active Ingredient Information for all products or individual Product Information for one specific Product ID Number.

<table>
<thead>
<tr>
<th>Product ID Number</th>
<th>EPA Reg. Number</th>
<th>Trade Name</th>
<th>Registration Year</th>
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</thead>
<tbody>
<tr>
<td>969953</td>
<td>70051-2-54705</td>
<td>70% NEEM OIL</td>
<td>2008</td>
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<tr>
<td>9226409</td>
<td>100-1098</td>
<td>ABOUND FLOWABLE FUNGICIDE</td>
<td>2007</td>
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<tr>
<td>932225</td>
<td>524-326</td>
<td>ACCORD HERBICIDE (DISC.)</td>
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<td>9786144</td>
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<td>ACCORD XRT</td>
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<td>98947</td>
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<td>AGRI STAR GLY STAR PRO</td>
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<td>AMISTAR FUNGICIDE</td>
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<tr>
<td>82821</td>
<td>71711-15</td>
<td>APPLAUD 70WP INSECT GROWTH REGULATOR (DISC.)</td>
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<tr>
<td>98948</td>
<td>42750-59</td>
<td>AQUA STAR</td>
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Hawaii Pesticide Product Data

239 Products Selected

Select and Submit Search Option:
- Active Ingredient
- Site of Application
- Pest to be Controlled
- EPA Registration Number
- Product Name
- Company Name

Or:
- Display Active Ingredient Information
- Display Product Information
- Start Over with New Search

Submit Choice

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Pest to be Controlled Search

Enter common name of PEST (e.g. bark beetle):

OR Select pest groups:

- Invertebrates
- Plants (e.g. weeds, grasses)
- Fungi (plant pathogens)
- Vertebrates (e.g. rodents, birds, snakes)
- Disinfectant Organisms (e.g. bacteria, viruses)
- Nematodes
- Protozoa and Other Unicellular Organisms

SubmitPest

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### Pesticides for Sale in Hawaii for Year Ending December 31, 2006

**Number of Products Selected:** 119

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<td>83189</td>
<td>55467-9</td>
<td>BUCCANEER PLUS GLYPHOSATE HERBICIDE</td>
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<tr>
<td>06208</td>
<td>55146-64</td>
<td>CHAMP FORMULA 2 FLOWABLE AGRICULTURAL</td>
<td>2008</td>
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</tbody>
</table>
70% NEEM OIL

EPA Registration Number: 70051-2-54705

Licensee: LAWN & GARDEN PRODUCTS, INC. C/O LY
P.O. BOX 1566
FALLON NV 89407-1566

HI Product ID Number: 969953

Registration Year: 2008
Signal Word: CAUTION
Formulation: SOLUBLE CONCENTRATE

Percent Active Ingredient
70.0000 Clarified hydrophobic neem oil (25007)

ALL SELECTED Sites and Pests
BANANAS (FOLIAR TREATMENT)
  ANTHRACNOSE
  SCAB
  DONNY MILDEW
  POWDERY MILDEW
  GREASY SPOT (CERCOSPORA)
  ALTERNARIA
BANANAS (GREENHOUSE-FOLIAR TREATMENT)
  ANTHRACNOSE
  SCAB
  DONNY MILDEW
  POWDERY MILDEW
  GREASY SPOT (CERCOSPORA)
  ALTERNARIA
BANANAS (NONBEARING)
  ANTHRACNOSE
  SCAB
  DONNY MILDEW
  POWDERY MILDEW
These labels are the “master” labels - NOT what’s found in the marketplace
- Registrants do not need to include all crops from the “master” label onto labels in the marketplace
- Therefore,
YOU MUST READ THE LABEL OF THE CONTAINER YOU INTEND TO PURCHASE, TO BE SURE IT CAN BE USED FOR THE INTENDED PURPOSE.
FUNGICIDES FOR BANANA

• Copper hydroxide
  – KOCIDE 101, 2000, DF, LF, 4.5LF
  – CHAMPION, CHAMP
  – BAC-STOP
  – NU-COP 3L, 50WP, 50DF, HB

• Copper oxide
  – NORDOX 75WG

• Tetraamine copper
  – LIQUI-COP

• Mancozeb
  – DITHANE M-45, F-45, DF, DF
  – RAINSHIELD, WSP
  – PENNCOZEB 80WP, 75DF
  – MANZATE 75DF, FL, PRO-STICK
  – MANKOCIDE
  – MANCOZEB 80 WP
  – LESCO 4 FL
FUNGICIDES FOR BANANA

- Maneb
  - MANEB 75DF, 80
  - MANEX FL
  - MANEX
- Fenbuconazole
  - ENABLE 2F
- Azoxystrobin
  - ABOUND FL
- Tebuconazole
  - ELITE 45 DF
- Thiabendazole
  - DECCO SALT No. 19
- Brewer’s yeast extract
  - KEYPLEX 350 OR
FUNGICIDES FOR BANANA

- **K-Bicarbonate**
  - KALIGREEN

- **Hydrogen Peroxide**
  - OXIDATE
  - STOROX

- **Fosetyl-Al**
  - ALIETTE WDG

- **Phosphorous acid**
  - FUNGI-PHITE

- **K-phosphate**
  - NUTROL LC

- **Oil**
  - SUPERIOR 70
  - SAF-T-SIDE SPRAY OIL
  - SUNSPRAY ULTRA-FINE SPRAY OIL
  - BIOCOVER UL, MLT
  - SPRAY OIL 10E, 13E
  - YEAR ROUND HORT OIL
  - GLACIAL SPRAY FLUID
  - PURESPRAY GREEN (OMRI)
NEMATICIDES/FUMIGANTS FOR BANANA

- 1,3-dichlorpropene
  - TELONE II, C-17
  - TELONE C-15
  - TRIFORM 35

- Fenamiphos
  - NEMACUR 3, 15% G
  
  - 5/31/2007 (Bayer stop)
  - 5/31/2008 (Distr. stop)

- Metam sodium
  - NEMASOL
  - VAPAM, HL
  - SECTAGON 42
  - METAM CLR 42%

- Ethoprop
  - MOCAP 10G

  - EC formulation to be cancelled
INSECTICIDES FOR BANANA

• Azadiractin/Neem
  – AZA-DIRECT
  – AZATROL
  – AZATIN XL
  – TRILOGY
  – AGRONEEM

• Pyrethrins
  – PROZAP FORMULA 66
  – PYRONYL CROP SPRAY
  – PYGANIC EC 1.4, 5.0
  – PYRENONE CROP SPRAY

• Carbofuran (to be cancelled, when?)
  – FURADAN 5% G

• Bacillus thuringiensis
  – DIPEL 2X, DF
  – XENTARI, DF
  – JAVELIN WG
  – CRYMAX
  – LEPINOX WDG
  – M-C BIOINSECT.
INSECTICIDES FOR BANANA

- Diazinon
  - DIAZINON 500 AG (Clean Crop)

- Sulfur
  - MICROSULF

- Buprofezin
  - APPLAUD 70WP

- Hydramethylnon
  - AMDRO PRO

- Fatty Acids (Soap)
  - M-PEDE
  - BON-NEEM

- Metaldehyde
  - DEADLINE BULLETS
  - DEADLINE M-P’S
  - PROZAP AGRI-BRAND
  - Will eventually be cancelled for use in many crops!
HERBICIDES FOR BANANA

- **Ametryn**
  - EVIK DF

- **Diuron**
  - KARMEX DF
  - DIURON 4L
  - DIREX 80DF, 4L
  - DIURON 80 WDG

- **Paraquat**
  - GRAMOXONE EXTRA
  - GRAMOXONE MAX
  - GRAMOXONE INTEON

- **Glyphosate**
  - ROUNDPUP ORIGINAL
  - ROUNDPUP CUSTOM
  - ROUNDPUP ULTRA DRY*
  - ROUNDPUP ULTRAMAX*
  - ROUNDPUP WEATHERMAX*
  - TOUCHDOWN
  - GLYFOS X-TRA*
  - GLYSTAR PLUS
  - GLYPHOSATE ORIGINAL
  - GLYPHOMAX PLUS*
  - etc., etc., etc.

* = bananacide also
HERBICIDES FOR BANANA

- **Oxyfluorfen**
  - GOAL 2XL (Dow AgroSciences)
    - HI-020001, expires 1/27/2007
      - EPA Reg. No. 707-243 (R&H)
    - HI-020006, expires 1/27/2007
      - EPA Reg. No. 62719-424

- **Pelargonic Acid**
  - SCYTHE
GROWTH REGULATORS FOR BANANA

- **Ethylene**
  - ETHYLENE AGRICULTURAL GRADE
  - BANANA GAS-32
  - ETHYLENE
  - LIVINGSTON’S NATURE RIPE

- **Ethanol**
  - ETHY-GEN II

- **Cytokinin**
  - SOIL TRIGGRR
  - FOLIAR TRIGGRR
  - STIMPLEX
STATUS OF PESTICIDE REGISTRATION PROJECTS

• Spinosad (SUCCESS/ENTRUST)
  – All 5 residue trials completed
  – All reports submitted to IR-4
  – IR-4 submitted tolerance petition to EPA in June 2003
  – Tolerance established March 2006
  – LABEL NOW AVAILABLE!!!
Supplemental Labeling

Success®
EPA Reg. No. 62719-292

For Foliar Insect Suppression of Thrips in Banana and Plantain

ATTENTION
- It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
- This labeling must be in the possession of the user at the time of application.
- Read the label affixed to the container for Success® Naturalyte® insect control before applying. Carefully follow all precautionary statements and applicable use directions.
- Use of Success according to this supplemental labeling is subject to all use precautions and limitations imposed by the label affixed to the container for Success.

Directions for Use

Refer to product label for Success for General Use Precautions, Mixing and Application Instructions.

Pests and Application Rates:

<table>
<thead>
<tr>
<th>Pests</th>
<th>Rate of Success</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(fl oz/acre)</td>
</tr>
<tr>
<td>banana rust thrips</td>
<td>8</td>
</tr>
<tr>
<td>caterpillars</td>
<td></td>
</tr>
<tr>
<td>Hawaiian flower thrips</td>
<td></td>
</tr>
</tbody>
</table>

Control of thrips may be improved by addition of an adjuvant to the spray mixture. See Use of Adjuvants section under Mixing on main label. Dilute sprays assume an average volume of 300 gallon per acre.

Specific Use Directions:

Application Timing: Apply no later than 2 weeks after bunch emergence and before flower petals senesce and again 1-2 days before bunch cover.

Specific Use Restrictions:
- Do not apply more than 29 fl oz of Success (0.45 lb a.i. spinosad) per acre per crop or make more than 4 applications per bunch.
- Pre-harvest Interval: Do not apply within 8 weeks of harvest.
- Minimum Re-treatment Interval: Do not make applications less than 7 days apart.
- Chemigation: Do not apply through any type of irrigation equipment.
STATUS OF PESTICIDE REGISTRATION PROJECTS

• Imidacloprid (ADMIRE and PROVADO)
  – All residue studies completed
  – All reports submitted to IR-4
  – Complicated study (foliar and soil treatments, samples from PR)
  – IR-4 submitted tolerance petition to EPA in March 2005
  – EPA proposed tolerance March 2006
  – Final ruling published 11 August 2006
  – Label pending
    • Bayer CropScience contacted
REREGERISTRATION ISSUES

• **Ethoprop (MOCAP)**
  – Ameded IRED published February 2006
  – EC formulation to be cancelled
  – 15% G formulation to remain registered in banana
  • Will require special backpack applicator to adapt to the “Lock ‘n Load” container
  • Bayer having a prototype made
    – We will make it available for use (O’ahu only?)
REREGISTRATION ISSUES

• Carbofuran (FURADAN)
  – EPA PRESS RELEASE INDICATED CARBOFURAN TO BE CANCELLED IMMEDIATELY
    – However, “immediately” not yet defined
      » FR notice not yet published
    – Import tolerances to remain
  – IRED published 03 August 2006
REREGISTRATION ISSUES

• Copper (various types and formulations)
  – Responded to EPA Risk Assessment
    • We submitted final version June 2006
    • Responded for copper hydroxide use in banana
      (e.g., Kocide, Nu-Cop, Champ)
        – Pests: sooty mold, various fungal diseases of banana
          bunches
        – One application per bunch (prior to bagging)
        – 4 lb ai/acre (2 lb Cu^{2+}/acre)
REREGISTRATION ISSUES

- Copper (various types and formulations)
  - Comment period closed March 2006, but EPA still accepted comments on refined use rates until June 2006
  - RED just published 09 August 2006
    - EPA proposed use pattern
      - 1.05 lb Cu\(^{2+}\)/acre
      - Retreatment interval: 7 days
      - Maximum seasonal application: 18.9 lb Cu\(^{2+}\)/acre
      - REI (copper hydroxide) = 48 hours
    - Comments being accepted until 10 October 2006
REREGISTRATION ISSUES

- Metaldehyde (e.g., Deadline M-P’s)
  - Responded to Risk Assessment in February 2006 (not only for banana, also papaya, etc.)
- RED just published 09 August 2006
  - Use in banana is not eligible for reregistration
  - Residue data required
    » Many crops fall into this category
    » The only uses allowed to be reregistered are:
      citrus, cole crops and other leafy greens, lettuce, tomato, strawberry (perennial type only), blueberry, caneberry and other berries, grass grown for seed, artichokes, and ornamentals
DIAZINON REREGISTRATION AND RISK ASSESSMENT IN BANANA

• Risk assessment:
  – http://www.epa.gov/pesticides/op/diazinon.htm

• Interim Reregistration Eligibility Document (IRED):
  – http://www.epa.gov/oppsrrd1/REDs/diazinon_ired.pdf

• Many restrictions:
  – e.g., closed cab system, engineering controls (closed delivery system), long REI, etc.
DIAZINON REREGISTRATION AND RISK ASSESSMENT IN BANANA

- **Bottomline**: Banana growers will be able to use diazinon until existing stocks of products with current (less restrictive) labels/labeling are depleted
  - i.e., under the current 24(c) registration
POSSIBLE EFFICACY RESEARCH

• Insecticides (dinotefuran and new Bayer product)
  – For aphid control
  – May be effective against thrips, also
  – Testing dependent on available resources; mainly personnel
    • We were not able to do any field testing this year (2006)
    • Might consider initial lab/greenhouse testing on tissue cultured banana
PAU!