

MACADAMIA NUT IPM PROTOCOL PEST MONITORING AND MANAGEMENT DECISIONS

Developed by: University of Hawaii, College of Tropical Agriculture and Human Resources – CTAHR
IPM Program (Revised 1/13/00)

| PART I: INSECT MANAGEMENT | PARTICIPANT RESPONSE REQUIRED (circle one “YES” OR “NO”) | | PROTOCOL INFORMATION (PARTICIPANT AND OFFICE) | | FOR OFFICE USE |
|--|---|-----------|--|----------------------|----------------------|
| | | | DESIGNATION | # POINTS POSSIBLE | # POINTS RECEIVED |
| 1. Tropical Nut Borer (TNB) Management | | | | | |
| A. Do you consider TNB to be a pest? | YES | NO | | | |
| 1. IPM Practice | | | | | |
| a. Do you monitor for TNB damage? | YES | NO | Cultural | 5 | |
| b. Do you have an established TNB economic action threshold? | YES | NO | Cultural | 7 | |
| B. DID DAMAGE LEVELS SURPASS THE ACTION THRESHOLD? | YES | NO | | | |
| 1. Was any action taken? | YES | NO | | | |
| a. Utilize recommended harvest schedule interval to minimize TNB damage. | YES | NO | Cultural | 5 (b) | |
| b. Administer Ethrel to induce a concentrated nut harvest to reduce nut exposure to the TNB. | YES | NO | Chemical | 3 (b) | |

(B) Bonus IPM Points

*Narrow or reduced risk chemical compounds are currently not available.

| | | | | | |
|--|------------|-----------|------------|-------|--|
| c. Modify harvest schedule to reduce TNB losses. | YES | NO | Cultural | 3 | |
| d. Use tree shakers to minimize stick tight density. | YES | NO | Mechanical | 2 (b) | |
| e. Remove susceptible TNB cultivars. | YES | NO | Cultural | 5 (b) | |
| TOTAL IPM POINTS POSSIBLE | | | | | |
| TOTAL IPM POINTS RECEIVED | | | | | |
| TOTAL BONUS (b) POINTS RECEIVED | | | | | |
| GRAND TOTAL POINTS RECEIVED | | | | | |

| | | | | | |
|---|------------|-----------|-----------------------|---|--|
| 2. Southern Green Stinkbug (SGSB) Management | | | | | |
| A. Do you consider SGSB to be a pest? | YES | NO | | | |
| 1. IPM Practice | | | | | |
| a. Do you monitor for SGSB damage? | YES | NO | Cultural | 5 | |
| b. Do you have an established SGSB economic action threshold? | YES | NO | Cultural | 7 | |
| B. DID DAMAGE LEVELS SURPASS THE ACTION THRESHOLD? | YES | NO | | | |
| 1. Was any action taken? | YES | NO | | | |
| a. Manage weed host of SGSB within and adjacent to the orchard to prevent seed pod formation and build up of SGSB populations. Concentrate weed control | YES | NO | Cultural/ Chemical | 3 | |

(b) Bonus IPM Points

*Narrow or reduced risk chemical compounds are currently not available.

| | | | | | |
|---|--|-----------|----------|-----|--|
| efforts to eliminate spiny amaranth, Spanish needle, balsam apple, and fuzzy rattlepod. | | | | | |
| b. Spot Treatment of Host Crop (CHOOSE ONE): | | | | | |
| 1. Broad spectrum compound | YES | NO | Chemical | 1 | |
| 2. Narrow spectrum compound* | YES | NO | Chemical | N/A | |
| 3. Reduced risk or biological compound* | YES | NO | Chemical | N/A | |
| | TOTAL IPM POINTS POSSIBLE | | | | |
| | TOTAL IPM POINTS RECEIVED | | | | |
| | TOTAL BONUS (b) POINTS RECEIVED | | | | |
| | GRAND TOTAL POINTS RECEIVED | | | | |

| | | | | | |
|---|------------|-----------|----------|---|--|
| 3. Koa Seed Worm (KSW)/Litchi Moth (LM) Management | | | | | |
| A. Do you consider KSW/LM to be a pest? | YES | NO | | | |
| 1. IPM Practice | | | | | |
| a. Do you monitor for KSW/LM damage? | YES | NO | Cultural | 5 | |
| b. Do you have an established KSW/LM economic action threshold? | YES | NO | Cultural | 7 | |
| B. DID DAMAGE LEVELS SURPASS THE ACTION THRESHOLD? | YES | NO | | | |

(b) Bonus IPM Points

*Narrow or reduced risk chemical compounds are currently not available.

| | | | | | |
|--|------------|-----------|--|-------|--|
| 1. Was any action taken? | YES | NO | | | |
| a. Use pheromone traps in historically high damage areas | YES | NO | Chemical | 5 (b) | |
| b. Spot Treatment of Host Crop (CHOOSE ONE): | | | | | |
| 1. Broad spectrum compound | YES | NO | Chemical | 1 | |
| 2. Narrow spectrum compound* | YES | NO | Chemical | N/A | |
| 3. Reduced risk or biological compound* | YES | NO | Chemical | N/A | |
| | | | TOTAL IPM POINTS POSSIBLE | | |
| | | | TOTAL IPM POINTS RECEIVED | | |
| | | | TOTAL BONUS (b) POINTS RECEIVED | | |
| | | | GRAND TOTAL POINTS RECEIVED | | |

| | | | | | |
|--|------------|-----------|----------|---|--|
| 4. Red Banded Thrips (RBT) Management | | | | | |
| A. Do you consider RBT to be a pest? | YES | NO | | | |
| 1. IPM Practice | | | | | |
| a. Do you monitor for RBT damage? | YES | NO | Cultural | 5 | |
| b. Do you have an established RBT economic action threshold? | YES | NO | Cultural | 7 | |
| B. DID DAMAGE LEVELS SURPASS THE ACTION THRESHOLD? | YES | NO | | | |

(b) Bonus IPM Points

*Narrow or reduced risk chemical compounds are currently not available.

| | | | | | |
|---|--|-----------|----------|-----|--|
| THRESHOLD? | | | | | |
| 1. Was any action taken? | YES | NO | | | |
| 1. Spot Treatment of Host Crop (CHOOSE ONE): | | | | | |
| a. Broad spectrum compound | YES | NO | Chemical | 1 | |
| b. Narrow spectrum compound* | YES | NO | Chemical | N/A | |
| c. Reduced risk or biological compound* | YES | NO | Chemical | N/A | |
| | TOTAL IPM POINTS POSSIBLE | | | | |
| | TOTAL IPM POINTS RECEIVED | | | | |
| | TOTAL BONUS (b) POINTS RECEIVED | | | | |
| | GRAND TOTAL POINTS RECEIVED | | | | |

| | | | | | |
|---|------------|-----------|----------|---|--|
| 5. Broad Mite (BM) Management | | | | | |
| A. Do you consider BM to be a pest? | YES | NO | | | |
| 1. IPM Practice | | | | | |
| a. Do you monitor for BM damage? | YES | NO | Cultural | 5 | |
| b. Do you have an established BM economic action threshold? | YES | NO | Cultural | 7 | |
| B. DID DAMAGE LEVELS SURPASS THE ACTION THRESHOLD? | YES | NO | | | |

(b) Bonus IPM Points

*Narrow or reduced risk chemical compounds are currently not available.

| | | | | | |
|---|------------|-----------|--|-----|--|
| 1. Was any action taken? | YES | NO | | | |
| a. Spot Treatment of Host Crop (CHOOSE ONE): | | | | | |
| 1. Broad spectrum compound | YES | NO | Chemical | 1 | |
| 2. Narrow spectrum compound* | YES | NO | Chemical | N/A | |
| 3. Reduced risk or biological compound* | YES | NO | Chemical | N/A | |
| | | | TOTAL IPM POINTS POSSIBLE | | |
| | | | TOTAL IPM POINTS RECEIVED | | |
| | | | TOTAL BONUS (b) POINTS RECEIVED | | |
| | | | GRAND TOTAL POINTS RECEIVED | | |

| PART II: RODENT MANAGEMENT | PARTICIPANT RESPONSE REQUIRED (circle one "YES" OR "NO") | | PROTOCOL INFORMATION (PARTICIPANT AND OFFICE) | | FOR OFFICE USE |
|--|---|-----------|---|-------------------|-------------------|
| | | | DESIGNATION | # POINTS POSSIBLE | # POINTS RECEIVED |
| A. Do you consider rodents to be a pest? | YES | NO | | | |
| 1. IPM Practice | | | | | |
| a. Do you monitor for rodent damage? | YES | NO | Cultural | 5 | |

(b) Bonus IPM Points

*Narrow or reduced risk chemical compounds are currently not available.

| | | | | | |
|---|------------|-----------|--|-------|--|
| b. Do you have an established rodent economic action threshold? | YES | NO | Cultural | 7 | |
| B. DID DAMAGE LEVELS SURPASS THE ACTION THRESHOLD? | YES | NO | | | |
| 1. Was any action taken? | YES | NO | | | |
| a. Set approved rodenticide bait stations out in rodent infested areas (spot application). [<i>*Awaiting approval of bait stations</i>] | YES | NO | Cultural | N/A | |
| b. Snap trapping rats in trees for small orchards. | YES | NO | Mechanical | 2 (b) | |
| c. Eliminate weeds and debris that host rodents and encourage rodent breeding. | YES | NO | Cultural | 3 | |
| | | | TOTAL IPM POINTS POSSIBLE | | |
| | | | TOTAL IPM POINTS RECEIVED | | |
| | | | TOTAL BONUS (b) POINTS RECEIVED | | |
| | | | GRAND TOTAL POINTS RECEIVED | | |

| <i>PART III: DISEASE MANAGEMENT</i> | <i>PARTICIPANT RESPONSE REQUIRED (circle one "YES" OR "NO")</i> | | PROTOCOL INFORMATION (PARTICIPANT AND OFFICE) | | FOR OFFICE USE |
|--|--|--|--|--------------------------|--------------------------|
| | | | DESIGNATION | # POINTS POSSIBLE | # POINTS RECEIVED |
| 1. Macadamia Quick Decline (MQD) Management | | | | | |

(b) Bonus IPM Points

*Narrow or reduced risk chemical compounds are currently not available.

| | | | | | |
|---|------------|-----------|----------|---|--|
| A. Do you consider MQD to be a pest? | YES | NO | | | |
| 1. IPM Practice | | | | | |
| a. Do you monitor for MQD damage? | YES | NO | Cultural | 5 | |
| b. If the disease is present, was any action taken? | YES | NO | | | |
| 1. Map out the location of diseased areas. | YES | NO | Cultural | 3 | |
| 2. Remove diseased tree and destroy residue. | YES | NO | Physical | 3 | |
| TOTAL IPM POINTS POSSIBLE | | | | | |
| TOTAL IPM POINTS RECEIVED | | | | | |
| TOTAL BONUS (b) POINTS RECEIVED | | | | | |
| GRAND TOTAL POINTS RECEIVED | | | | | |

(b) Bonus IPM Points

*Narrow or reduced risk chemical compounds are currently not available.

| | | | | | |
|--|------------|-----------|--|-------|--|
| 2. Blossom and Raceme Blight Management | | | | | |
| A. Do you consider blossom and raceme blight to be a pest? | YES | NO | | | |
| 1. IPM Practice | | | | | |
| a. Do you monitor for blight? | YES | NO | Cultural | 5 | |
| b. If blight is present, was any action taken? | YES | NO | | | |
| 1. Trees are pruned annually to increase air circulation and penetration. Prunings are removed or destroyed. | YES | NO | Cultural | 3 (b) | |
| | | | TOTAL IPM POINTS POSSIBLE | | |
| | | | TOTAL IPM POINTS RECEIVED | | |
| | | | TOTAL BONUS (b) POINTS RECEIVED | | |
| | | | GRAND TOTAL POINTS RECEIVED | | |

| <i>PART IV: WEED MANAGEMENT</i> | <i>PARTICIPANT RESPONSE REQUIRED (circle one "YES" OR "NO")</i> | | PROTOCOL INFORMATION (PARTICIPANT AND OFFICE) | | FOR OFFICE USE |
|--|--|-----------|--|--------------------------|--------------------------|
| | | | DESIGNATION | # POINTS POSSIBLE | # POINTS RECEIVED |
| A. Do you consider weeds to be a pest? | YES | NO | | | |

(b) Bonus IPM Points

*Narrow or reduced risk chemical compounds are currently not available.

| | | | | | |
|---|------------|-----------|----------|-------|--|
| 1. IPM Practice | | | | | |
| a. Strip weed management (CHOOSE ONE): | | | | | |
| 1. Broad spectrum compound | YES | NO | Chemical | 1 | |
| 2. Narrow spectrum compound* | YES | NO | Chemical | N/A | |
| 3. Reduce risk or biological compound* | YES | NO | Chemical | N/A | |
| b. Spot weed management (CHOOSE ONE): | | | | | |
| 1. Broad spectrum compound | YES | NO | Chemical | 1 | |
| 2. Narrow spectrum compound* | YES | NO | Chemical | N/A | |
| 3. Reduce risk or biological compound* | YES | NO | Chemical | N/A | |
| c. Non-chemical weed management techniques (mowing, cover crops, cultivation, etc.) | YES | NO | Cultural | 5 (b) | |
| d. Rotation of crop protection chemicals to avoid pesticide resistance. | YES | NO | Chemical | 5 | |
| TOTAL IPM POINTS POSSIBLE | | | | | |
| TOTAL IPM POINTS RECEIVED | | | | | |
| TOTAL BONUS (b) POINTS RECEIVED | | | | | |
| GRAND TOTAL POINTS RECEIVED | | | | | |

(b) Bonus IPM Points

*Narrow or reduced risk chemical compounds are currently not available.

| PART V: NUTRIENT MANAGEMENT | PARTICIPANT RESPONSE REQUIRED (circle one "YES" OR "NO") | | PROTOCOL INFORMATION (PARTICIPANT AND OFFICE) | | FOR OFFICE USE |
|---|---|-----------|--|----------------------|----------------------|
| | | | DESIGNATION | # POINTS POSSIBLE | # POINTS RECEIVED |
| 1. Orchard Nutrient Management Decisions | | | | | |
| 1. IPM Practice | | | | | |
| a. Leaf tissue analysis conducted twice a year (preferably spring and summer). | YES | NO | Cultural | 4 | |
| b. Maintain records and fertilizer according to test results. | YES | NO | Cultural | 2 | |
| c. Annual soil analysis to determine PH regulation and pre-plant fertilizer requirements. | YES | NO | Cultural | 4 | |
| d. Maintain a nutrient management log recording the fertilizer, application rates and dates of application. | YES | NO | Cultural | 2 | |
| e. Calibrate and service fertilizer spreader annually. | YES | NO | Mechanical | 3 | |
| TOTAL IPM POINTS POSSIBLE | | | | | |
| TOTAL IPM POINTS RECEIVED | | | | | |
| TOTAL BONUS (b) POINTS RECEIVED | | | | | |
| GRAND TOTAL POINTS RECEIVED | | | | | |

(b) Bonus IPM Points

*Narrow or reduced risk chemical compounds are currently not available.

| <i>PART VI: Sprayer Calibration</i> | <i>PARTICIPANT RESPONSE REQUIRED (circle one "YES" OR "NO")</i> | | PROTOCOL INFORMATION (PARTICIPANT AND OFFICE) | | FOR OFFICE USE |
|---|--|-----------|--|------------------------------|-------------------------------|
| | | | DESIGNATION | # POINTS POSSIBLE | # POINTS RECEIVED |
| 1. IPM Practice | | | | | |
| a. Maintain spray records and calibrate all sprayers once a year. | YES | NO | Mechanical | 3 | |
| TOTAL IPM POINTS POSSIBLE | | | | | |
| TOTAL IPM POINTS RECEIVED | | | | | |
| TOTAL BONUS (b) POINTS RECEIVED | | | | | |
| GRAND TOTAL POINTS RECEIVED | | | | | |

(b) Bonus IPM Points

*Narrow or reduced risk chemical compounds are currently not available.

Macadamia Nut IPM Protocol Point Sheet

| | TOTAL IPM POINTS POSSIBLE | IPM POINTS RECEIVED | BONUS (b) POINTS RECEIVED | GRAND TOTAL POINTS RECEIVED |
|---|----------------------------------|----------------------------|----------------------------------|------------------------------------|
| Tropical Nut Borer (TNB) | | | | |
| Southern Green Stinkbug (SGSB) | | | | |
| Koa Seed Worm (KSW) / Litchi Moth (LM) | | | | |
| Red Banded Thrips (RBT) | | | | |
| Broad Mite (BM) | | | | |
| Rodent Management | | | | |
| Macadamia Quick Decline (MQD) | | | | |
| Blossom Rot & Raceme Blight | | | | |
| Weed Management | | | | |
| Nutrient Management | | | | |
| Sprayer Calibration | | | | |
| TOTAL | | | | |

| | |
|---------------------|--|
| LEVEL OF IPM | |
|---------------------|--|

EVALUATOR: _____ **EVALUATION DATE:** _____

(b) Bonus IPM Points
 *Narrow or reduced risk chemical compounds are currently not available.