STATUS OF LOCAL KNOWLEDGE AND PRACTICES OF COMMUNITIES ON PEST AND DISEASE MANAGEMENT IN TREE NURSERIES IN BILIRAN PROVINCE, PHILIPPINES

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Background and Rationale

With the implementation of the National Greening Program (NGP) and now the e-NGP of DENR, two of the main concerns are

- Insuring continuous production and supply of high quality planting stocks

- Installing high level of success in plantation establishment

Problem of maintenance of seedling quality including absence of pests and diseases

- Lack of awareness/understanding on pests and diseases and control

General Objective

- To assess the occurrence of pests and diseases in tree nurseries of NGP planting stock suppliers including their local pest management schemes

  - development of key pest management interventions

Methodology

1. Pest and disease survey, damage/severity assessment
2. Identification of pests and diseases, description of damage and symptoms, determination of factors affecting occurrence, and documentation
3. Interview about local knowledge on pest management practices
4. Formulation of local pest management plan
5. Drafting and production of coffee table book on common tree nursery pests and diseases

Methodology

- Pest & Disease Survey and Key-Informant-Interview

- Four tree nursery sites in Biliran province

  - PENRO nursery, Naval
  - KFAI nursery, Brgy Kawayanon, Caibiran
  - Private nursery, Brgy Villa Vicenta, Caibiran
  - MFAI nursery, Brgy Masagaosao, Kawayan

Methodology

*% Incidence = $\frac{\text{No. of plants affected by pest/disease}}{\text{Total no. of plants examined}}$ X 100

**% Severity = $\frac{\text{Sum of all ratings}}{\text{Total ratings (20) x max. rating (3)}}$ X 100

**Severity scale:

0= no damage/symptom in plant

1= <25% damage/symptom in plant (Low)

2=26-50% damage/symptom in plant (Moderate)

3=>50% damage/symptom in plant (High)

No. of sample plants: 20/plot in 3 plots

Methodology

K-I-I

- Determined:

  a) the level of awareness/knowledge

  b) existing management approaches employed

  c) learnings and/or extent of exposure to pest and disease management practices, and

  d) training and information needs

Result Highlights

Pest & Disease Survey

- Low to high incidence/severity of pests & diseases in the different sites depending on tree species; mostly host-specific

- Grasshoppers, mites, mirid bugs, hoppers, thrips, scales, psyllids, cutworms, whiteflies, red spider mites, leafrollers, and mealybugs

- Fungal & bacterial pathogens with varying degrees of severity/damage

Site: PENRO Nursery, Brgy Larrazabal, Naval, Biliran

Tree Species	Pest/Disease	Incidence (%)	Severity (%)	Damage/Symptoms
Narra	Ray leafspot	95	31.7	Small yellow spots, coalescing, later developing black stromata
	Tar spot	5	1.7	Tiny, black, round, raised surface stromata
Mahogany	Bacterial spot	30	10	Water-soaked, round, black spots on leaves
Yakal	Cutworms	90	30	Holes on leaves
	Blight	70	23.3	Sudden leaf marginal necrosis
	Gall mites	80	80	Curling of leaves, browning of underside, yellowing of upper surface
Gmelina	Mites	50	33.3	Yellow spots on leaves
	Grasshoppers	25	8.3	Cuts on leaves
Toog	Mirid bugs	15	10	Dried angular leafspots
Barayong	Leafrollers	5	5	Rolling of leaves at shoots

Mite damage on yakal

Narra ray leafspot

Tar spot on narra

Grasshopper damage on *Gmelina*

Mite damage on *Gmelina*

Sunscalding

Bacterial leaf spot on mahogany

Site: KFAI Nursery, Brgy Kawayanon, Caibiran, Biliran

Tree Species	Pest/Disease	Incidence (%)*	Severity (%)**	Damage/Symptom
Acacia mangium	Blight	20	6.7	Drying of leaves, blighting from margins
	Red spider mites	30	10	Reddish brown scabby streaks on leaves
Acacia auriculiformis	Powdery mildew	55	36.7	White powdery coating on leaf surface
	Thrips	50	33.3	Curling of leaves, little leaves with scabby texture
	Sooty molds	10	3.3	Dark mildews on leaf surface
	Scale insects	10	3.3	Drying of leaves
Narra	Ray leafspot	40	13.3	Yellow spots, later black stromata
	Orange leafspot	25	8.3	Tiny, rust-like pustules on leaves
Toog	Mirid bugs	20	6.7	Membranous, necrotic dry spots

Site: KFAI Nursery, Brgy Kawayanon, Caibiran, Biliran (Continuation)

Tree Species	Pest/ Disease	Incidence (%)*	Severity (%)**	Damage/Symptom
Lauan	Leafspots/ Blights	40	13.3	Dry irregular spots
Dao	Leafspots	55	18.3	Small brown spots
Bagalunga	Wilting & root rot	50	50	Wilting, death of seedlings
Ipil-ipil	Psyllids	10	3.3	Withering of shoots, death of entire seedling
Falcatta	Sooty molds/Mealybugs	50	16.7	Dark mildew, drying of shoots, wilting
Kamagong	Grasshoppers	25	8.3	Cuts on leaves
Hindang	Leafminers	25	10	Feeding trails on leaves
Nato	Sunscald	10	3.3	Blisters and dried spots on leaves
Bitanghol	Sunscald	15	5	Blisters and dried spots on leaves

Mirid bug damage on to-og

Psyllids on ipil-ipil

Narra ray leafspot

Blighting on lauan

Thrips injury on *A. auriculiformis*

Mealybug & sooty mold infestation on falcatta

Scale insects on *A. auriculiformis*

Powdery mildew

Leaf blight of *A. mangium*

Red spider mite damage on *A. mangium*

Leafspot of bagalunga

Leafspot of da-o

Orange leafspot of narra

Site: Brgy Villa Vicenta, Caibiran, Biliran

Tree Species	Pest/ Disease	Incidence (%)*	Severity (%)**	Damage/Symptom
Narra	Hoppers	95	70	Silver glazing on upper leaf surface
	Ray leaf spot	70	46.7	Yellow leafspots, developing black stromata
Bahai	Thrips	75	50	Galls on leaves, holes, splitting of bark

Narra ray leafspot

Thrip damage on bahai

Leaf hopper damage on **narra**

Site: Brgy Masagaosao, Cawayan, Biliran

Tree Species	Pest/Disease	Incidence (%)*	Severity (%)**	Damage/ Symptom
Toog	Whiteflies	10	1.77	Drying of leaves, shoots
Coffee	Leafspots Beetles	25 10	8.3 3.3	Black spots on leaves Cuts and holes on leaves
Narra	Ray leafspot	25	8.3	Yellow spots with black stromata
Kamagong	Mealybugs	5	1.7	Drying up of apex/shoots

Nursery factors contributing to pest and disease incidence

- Sanitation problem
- Overcrowding of plants, improper spacing
- Presence of weeds and coarse vegetation
- Lack of adequate shade structures
- Lack of organized structures e.g. potting sheds, transplant sheds, germination beds, hardening beds, and storage areas.

K-I-I Results

- ***Level of awareness/understanding***
  - Familiarity with damage and symptoms
  - Lack of knowledge on cause/identification
  - High pest population or high degree of severity/damage is considered basis for control
  - Lack ability to differentiate diseases from abiotic stresses
  - Visual monitoring of general health of plants is being practiced

K-I-I Results

- ***Existing local management practices***

- Physical/mechanical tactics (putting up of nets, germination chamber, shade/protective structures, soil pasteurization, handpicking)
- Biological tactics (use of mycorrhiza, rice hull composts, vermicast, antagonists e.g. *Trichoderma*, plant extracts/biopesticides e.g. neem oil, 'panyawan', chili, 'lagtang', 'tuba', 'tubli' and use of natural enemies of insects e.g. *Trichogramma*)

- Cultural control practices (spacing of seedlings, sorting, pruning, trap crops, shading, water management) but not fully maximized
- Chemical control –usual method
  - Insecticides are generally used even for diseases
- No pest management plan (more reactive)

K-I-I Results

- ***Learnings/extent of exposure***

- Most obtain information from technical people, however, inadequate.

- Exercise own sense of judgment in dealing with pest & disease problems; trial and error

K-I-I Results

- ***Training and information needs***

- training and access to information about pest and diseases,
  - recognition of damage and symptoms
  - monitoring and diagnosing skills
  - integrated pest management options

- on-site training, seminars, and IEC materials.

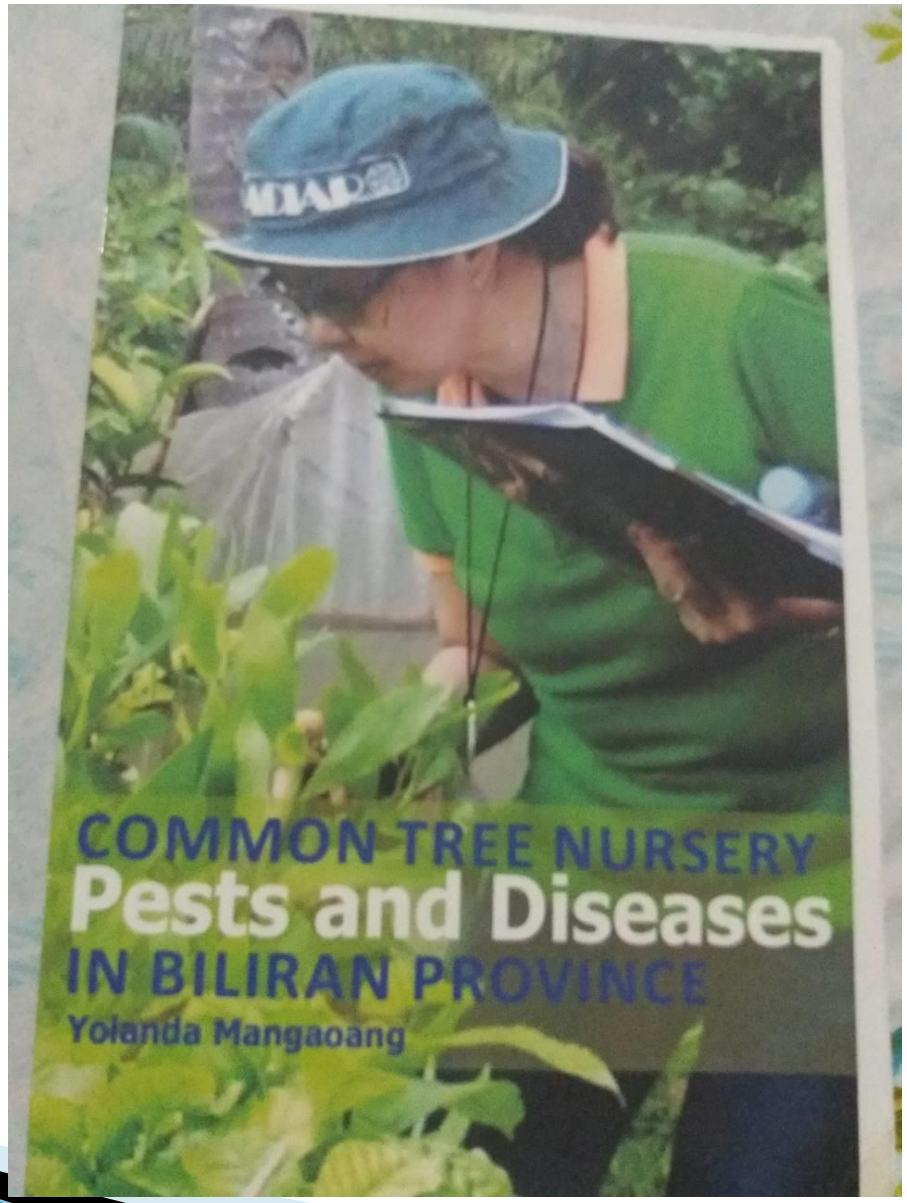
Management Options for Diseases

1. Practice sanitation
2. Observe proper spacing/avoid overcrowding
3. Removal/proper disposal of infected leaves
4. Avoid excessive watering in the late afternoon
5. Provide optimum seedling nutrition/avoid over fertilization
6. Place seedlings on raised beds
7. Apply commercial fungicides/botanical extracts as protectants
8. Provide moderate sunlight/allow partial shading
9. Eliminate weedy areas in the vicinity
10. Use clean, pathogen-free soil

Management Options for Arthropod Pests

1. Practice sanitation
2. Eliminate weedy areas/coarse vegetation
3. Observe proper spacing/avoid overcrowding
4. Adequate watering in the morning on hot days
5. Removal/proper disposal of infested parts
6. Provide trap plants/attractants to divert pests
7. Sort seedlings according to size/age
8. Provide optimum seedling nutrition/avoid excess fertilization
9. Adequate sunlight exposure/avoid shading
10. Maintain plants for natural enemies of pests
11. Physical control: install sticky traps, light traps, insect nets
12. Chemical control: insecticides, miticides
13. Botanical extracts versus insects & mites
14. Hardening on raised beds make plant more resistant

Drafting of coffee table book



Conclusion

- Pests and diseases occurred at varying incidence and severity levels on many tree species
- Damage/symptoms were mostly noticeable, affected physical quality, general health

- Generally, nurseries lacked sanitation, had weedy areas and coarse vegetation, overcrowded, and lacked organized structures for nursery operations
  - Created microenviroment favoring/enhancing pest/disease occurrence

Conclusion

- Nursery personnel had inadequate knowledge on diagnosis of pest problems and lacked awareness on alternative management options
- Local knowledge on pest management is generally limited to chemical control
- Expressed need for training on pest and disease diagnosis and management
- All these findings indicate the need for pest management intervention

Recommendations

- Pest management particularly in tree nurseries must be given more attention or serious implementation
- Skills trainings, seminars, and other information dissemination activities need to be conducted
- Pest management plan must be part of accreditation requirements for nurseries

Thank You!