Integrated Pest Management (IPM) 2017 Report

Coordinator: Anne Jack, UK, USA
SC Liaison: Colin Fisher, UK, USA

Santa Cruz, 24 October 2017

Integrated Pest Management (IPM) SG Meeting

- Meeting Sunday 22 October 2017
  - 44 registered
  - 28 attended
  - Several volunteers
- Anyone who missed the meeting
  - If you are interested – please contact me
  - Here at the conference or at amjack2@uky.edu






Integrated Pest Management (IPM) SG History & Background

- **Membership consistently >90**
  - **Academic – universities & research stations; researchers & extension**
  - **Industry – leaf dealers & manufacturers**
- **Currently**
  - **152 members**
  - **29 countries**
    - Need more Asian representation
    - Especially India & China

Objectives

- **IPM is defined by the American Phytopathology Society as:**
  - **"A sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks".**
- **Objectives**
  - **To summarize available IPM strategies for each pest & disease**
  - **To produce a document for agronomists & farmers**
    - structured by disease or pest
    - with a common outline framework based on relevant IPM methods
  - **To make document available on CORESTA website in pdf format**

Value of Previous IPM Work

- **IPM is not new – INTEGRATED management system**
  - **Zimbabwe, TRB handbook 1950's recommended**
    - Rotation for nematode control
    - Hygiene for TMV control
    - Avoiding over-fertilization for bacterial foliar disease control
  - **US grower guides 1940's recommended**
    - Rotation & hygiene for black shank control
    - Hygiene for TMV control
- **Some new IPM strategies**
  - **Mostly built on well-established principles**

How This Work Helps the Scientific Community

- **Lower CPA residues – BIG issue for tobacco industry**
  - **CPAs may be replaced or partly replaced by other strategies**
  - **Lower levels applied**
    - Scouting
    - Proper application
    - Less disease

How This Work Helps the Scientific Community

- **Lower CPA residues – BIG issue for tobacco industry**
  - **CPAs may be replaced or partly replaced by other strategies**
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    - Scouting
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- **Lower diseases/pest populations – resulting easier control, less CPAs**
  - **Rotations, good hygiene etc.**
    - Prevent or slow build-up of diseases / pests
- **Sustainable production – soils, disease/pest levels, flora/fauna**
  - **Will we be growing tobacco 20 years from now?**

IPM Task Force Members

- **Members**
  - Authors
  - Reviewers
  - Contributors of photographs
  - Observers, commentators
- **64 plant protection specialists**
  - 31 pathologists
  - 24 entomologists
  - 8 nematologists
  - 6 weed scientists


A.2. Bacterial Diseases

16. Wildfire, angular leaf spot *Pseudomonas syringae* pv. *tabaci* tox+, tox-
Anne Jack, University of Kentucky, USA

General

These diseases can affect tobacco in both the seedbeds / float trays and the field, although wildfire (tox+) tends to be more of a problem in the seedbed and angular leaf spot (tox-) in the field. Wildfire and angular leaf spot are not major problems in many tobacco producing areas, such as the USA, Brazil and Europe. In Africa, they are diseases of major importance which can cause devastating losses, especially in wet seasons. All control measures discussed refer only to areas where they are diseases of economic importance, and are not usually necessary in areas such as the USA.

Symptoms

The symptoms of the tox+ (toxin producing) and tox- forms of this disease are quite different. Wildfire (tox+) is characterized by a small brown or black watersoaked lesion, surrounded by a chlorotic halo (Figure 16.1). Wildfire can be systemic in seedlings, causing distortion (Figure 16.4). The angular (tox-) lesion is brown, dark brown or black, much larger than the wildfire lesion, has little or no chlorotic halo, and has angular margins because the lesion is confined by the lateral veins (Figure 16.2). In Africa, both diseases tend to be more severe at the top of the plant (Figures 16.1, 16.2).

Source and Transmission

Bacteria are spread within the field, from field to field and from infected weed hosts in wind-driven water droplets. Driving rains exacerbate the problem considerably. These diseases can also be seed transmitted. Debris from infected plants is a source of inoculum, as it infects overwintering weed hosts. In the semi-tropical areas where these diseases are a problem, winters are seldom cold enough to kill overwintering weeds.

Site Selection


Fig 16.3: Susceptible variety (left), resistant variety (right). A: angular B: wildfire
Michelle du Toit, Zimbabwe
Fig 16.4: Systemic wildfire on seedlings
Michelle du Toit, Zimbabwe

General

- **Communication**
  - **Email**
  - **Annual meetings at conferences**
- **Executives**
  - **Editors**
    - Anne Jack, Colin Fisher (UK, USA)
  - **Group leaders**
    - Emily Pfeufer (UK, USA)
    - Chuck Johnson (VT, USA)
    - Paul Semptner, (VT, USA)
    - Andy Bailey (UK, USA)
    - Cecilia Dorfey (JTI, Germany)





Task Force Structure

- 80 chapters over 5 groups
  - diseases
  - nematodes
  - insects
  - weeds
  - IPM strategies
- Each with a group leader
  - organizes group
  - collects chapters
  - arranges reviews





Task Force Approach

Same approach for 3 groups

Diseases

fungal
bacterial
viral
seedling
post-harv

Nematodes

Insects

- Groups divided into sections
- Chapter for each disease or pest

Task Force Approach

Weeds group

Field Weeds

Parasitic Weeds

Different approach

- **Principles of weed control**
- **Specific weed problems**

IPM Strategies

Biological Control

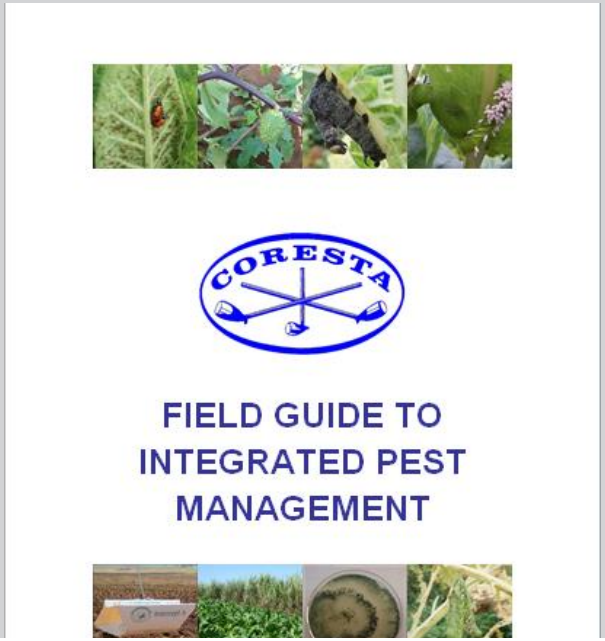
Rotation

Correct CPA Usage

- **Sections deal with general IPM principles**

On-Going Work

- **Final product**
  - **Digital document**
  - **Downloadable PDF**
    - Continually updated



About to be updated

Remaining Work

- **Collect outstanding chapters**
  - **Some not done, some in progress**
    - Some new chapters received
    - New authors & leaders
- **Complete outstanding reviews, editing**
  - **Currently in progress**
  - **5 chapters ready for website review**
- **Document posted incomplete**
  - **Task force → subgroup**
    - Add completed chapters
    - Update existing chapters

IPM Taskforce

Completed Documents

Home
Taskforce Overview
Working Documents
IPM Images
Completed Documents
IPM Presentations
Final Report
Useful Links

As each completed chapter has been reviewed and edited, it will be placed on this page for general review by the taskforce. Members will be notified by email when a document has been posted online. Please peruse any documents which are of interest to you, and let us know if you have any comments.

We would encourage those of you with experience of any particular topic to comment and contribute, especially if you know of any IPM strategy which has been omitted. We are particularly interested in a global perspective and welcome suggestions of different strategies from our diverse membership.

Each document will be posted online for one month. The post date and expiration date included in the table below will also be in the notification email. Please send comments to the author using the ***Comments*** link in the table; these comments will be automatically copied to the section leader (see Taskforce Overview page for assistance) and the taskforce coordinator.

10/21/15: There are currently no chapters for website review, but several chapters will be posted shortly.

Document Name	Post Date	Expires	Author	Reviewer 1	Reviewer 2	*Comments: please contact

*Note: email comments to the author will automatically be carbon copied to the IPM Taskforce coordinator and to the relevant section leader.

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Last Updated: October 22, 2015

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Final Document: Samples

CORESTA

FIELD GUIDE TO INTEGRATED PEST MANAGEMENT

Updated 22 October, 2015

FOREWORD

CORESTA Integrated Pest Management Taskforce

The tenets of good agricultural practice are to provide the world's populace with affordable food now, and into the future. This will only be realized if agricultural production is both profitable and sustainable. Integrated pest management is one of the many components necessary achieve this.

The only crop protection resources available to the first farmers about 12 000 years ago was some form of biological control, such as picking insects off the crop by hand. Perhaps the first IPM practice was securing the harvested grain in insect-proof earthen jars. Crops were first dusted with powdered sulphur 4 500 years ago, and selecting the best quality seed for the following season's crop was the first inadvertent plant breeding program. Through experience, agricultural practices progressed slowly until more recent times when science accelerated our understanding of crop production including pest and disease management. Early forays into pesticide use included mercury, arsenic and lead until as recently as the 1950's and then the over use of DDT caused a major revision of policy by the agricultural community. Quite apart from any potential damage to the environment by the liberal use of pesticides, there are many other methods of reducing the impact of pest and diseases that have been used, often in local communities with some particular problem.

To this end, the CORESTA membership saw the need for an avenue of sharing this information within the tobacco community. Many of the world's leading tobacco specialists have been compiled into providing a resource that is intended as a practical guide that field technologists can use to provide advice to growers in all aspects of integrated pest management.

The information provided is not definitive because any recommendations to growers must take cognizance of socio-economic constraints unique to a specific production area, and must be adjusted for new developments.

Anne Jack, University of Kentucky, USA
Taskforce Coordinator
Editor

Colin Fisher, University of Kentucky, USA
Editor

TABLE OF CONTENTS – OUTLINE

Final Document: Better Samples

IPM STRATEGIES

FOREWORD

IPM Strategies

Integrated Pest Management (IPM) has become a fundamentally integrated aspect of how tobacco is produced worldwide, since pests, diseases and weeds affect crop yield and quality, as well as lower income for the growers in the event of uncontrolled pest or disease outbreak.

To sustain a crop production in a business operating environment that is (and will be) ever more strictly regulated, the pursuit of more comprehensive adoption of Good Agricultural Practices (GAP) and the promotion and adoption of preventive and integrated measures to reduce the risk of pest and disease occurrence is crucial for an efficient tobacco production that meets the requirements of yield, quality and integrity, while also complying with environmental requirements and regulations.

An insect, a bacteria or a virus is not a pest or disease agent *per se* – they only become pests or diseases when optimal conditions for their development are provided. The fundamental concept of IPM is that each aspect of and within the agricultural ecosystem has a role to play and there is a tolerance limit that should be accepted before more extreme measures are required.

IPM strategies should take into account the environment, cultivation practices, and local socio-economic constraints, prioritizing the adoption of techniques that promote, enhance and or/protect the health and good quality of the agro environment as a whole thus contributing to the maintenance of ecological balance with reduced risk of pest/disease outbreaks. These techniques include the selection of suitable varieties, adoption of locally recommended cultural practices, soil and water conservation practices, use of biological control agents or other alternative methods in combination with responsible and rational use of Crop Protection Agents (CPAs).

Adequate and correct use of CPAs is a fundamental component of IPM. When CPAs are used only when necessary and in the recommended manner, following appropriate application rates and methods, as well as complying with health and safety requirements, the challenges from pests and diseases are confined, there is reduced risk of pest and disease developing resistance and minimized risk of excessive residue accumulation in the leaf. Selective products also allow natural enemy populations (predators and parasitoids) to develop to the detriment of pests.

Moreover, the effective implementation of any IPM strategy starts from raising awareness, training and engagement of field staff and the tobacco grower base.

Cecilia Dorfey, JT International Germany GmbH
IPM Strategies Group Coordinator

FOREWORD

Integrated Disease Management

Tobacco may become infected by a number of different pathogens, from viruses to bacteria to fungi and oomycetes, at every stage of production. Integrated disease management combines cultural and chemical approaches to provide reliable disease reduction. Since no single practice is guaranteed to reduce disease, a broad, integrated approach helps safeguard crops from total failure. Truly integrated disease management applies one or more control tactics to each of the three components of the plant disease triangle: the pathogen, the tobacco host, and the environment.

Pathogen-centric control tactics focus on preventing the introduction of the pathogen to transplant production or the field, reducing new plant infections once pathogens have been identified, and minimizing disease severity. The most obvious pathogen-centric control is fungicide application, which depending on the mode of action, can prevent new infections or slow disease development. In all cases, however, fungicides are most effective when applied preventatively to otherwise healthy, unstressed plants. Active cultural management can reduce or even eliminate the need to introduce chemical tactics for select common diseases. For instance, the soilborne oomycete pathogen *Phytophthora nicotianae*, which causes black shank, may be spread by moving infested soil from field to field on tractors, setters, or boots. Combined with an understanding of farm-specific disease history, simple cleaning of these materials between fields can significantly reduce the potential to spread *P. nicotianae* to an uninfested field.

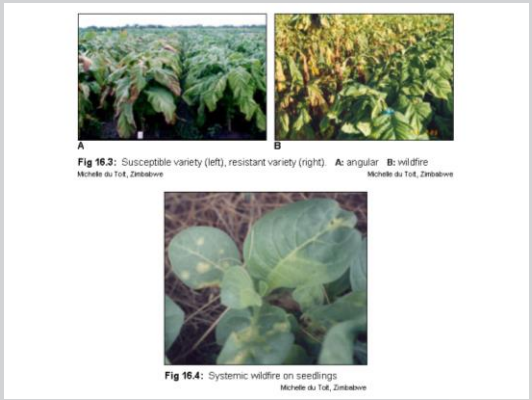
Host-centric control tactics focus largely on varieties bred for resistance to common diseases. In addition to minimizing injury from insects, herbivores, and equipment. New tobacco variety releases have been bred for different resistance "packages," simultaneously possessing resistance to several plant diseases. For example, the burley tobacco variety KT206 has high resistance to black shank, black root rot, viruses, and TMV. Starting transplants with a stacked resistance package gives tobacco an advantage over yield-limiting diseases before plants are even set in the field. Insect management not only improves quality, but also reduces viral and bacterial diseases, which may be vectored by insects or need a wound for infection, respectively.

Finally, environment-focused tactics center on reducing plant stresses through proper fertility, water management, and weed control. As examples, tobacco stressed for boron, a trace micronutrient, is more susceptible to leaf breakage, which can in turn increase hollow stalk and other bacterial diseases. Standing water should be avoided in fields at all times, which can also be oriented in the direction of best wind flow to minimize leaf wetness, given site history. Weeds not only compete with tobacco for nutrients, but also serve as pathogen and insect reservoirs.

By taking a diversified, preventative approach, growers can safeguard their tobacco crops from yield-damaging diseases. While integrated tactics may involve more labor than strictly fungicide-based disease management, higher quality tobacco crops may be produced with fewer concerns about chemical residues.

Emily Pfeufer, University of Kentucky, USA
Disease Group Coordinator

Acknowledgements



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Site Selection

- **Our many members**
  - **Photo contributors**
  - **Reviewers**
  - **Especially authors**
- **CORESTA**

THANK YOU