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Dear Grower,

CLIMATE CHANGE AND THE RESURGENCE OF SOME PESTS AND DISEASES

Introduction

It was anticipated that climate change would pose certain challenges in agriculture, including a change in status of pests and diseases.Indeed,following the extremely hot and dry conditions experienced in Zimbabwe this agricultural season, certain pests and diseases, previously considered not economically important on tobacco,have become prominent. There have been numerous reports of the arachnid red spider mite (*Tetranychus evansi)*on all tobacco varieties while powdery mildew/white mould(*Erysiphe cichoracearum*) has been reported on the variety K RK66 in the current season.

Red spider mite has never been of economic importance in the history of tobacco production in Zimbabwe while white mould was a serious disease of tobacco in the 1960s. The current upsurge of these problems can be explained by the fact that the *Tetranychus* spp*,* flourish mostly in hot and dry weather conditions, while *Erysiphe* spp flourishes under mildconditions with little rain. Thus, the patchy rainfall and cooler temperatures in recent weeks, following on the heels of the very hot and dry conditions, have proved very conducive for disease development.

1. Red Spider Mite

1.1 Description of Pest

The red spider mite is a very small orange-red mite (0.3 – 0.5 mm) that is barely visible to the nakedeye but is seen as reddish or greenish spots on leaves and stems. It has a development time of 8 days from egg to adult.The short life cycle and high numberof eggs laid give *T. evansi* the power to increase rapidly to very high numbers on suitable hosts when environmental conditions are favourable. It lays its eggs on the leaves, and damages host plants by sucking cell contents from the leaves cell by cell, leaving tiny pale spots or scars where the green epidermal cells have been destroyed. Although the individual lesions are very small, attack by thousands of spider mites can cause numerous lesions and thus can significantly reduce the photosynthetic capability of plants.

1.2 Damage Symptoms

Damage first appears as stipples that later give way to a yellowish and silvery appearance (Fig 1). The mites prefer the lower surface of leaves but in severe infestations occur on both leaf surfaces as well as on stems. As the population increases, the mites may completely cover the plants as adults spin copious webs and form clusters on the tips of heavily infested leaves from which they are easily dispersed by air currents.

Fig 1: Red spider damage on flue-cured tobacco

Damaged leaves senesce prematurely causing problems with curing and in some cases, the leaves turn brown and die. Red spider mites thrive when long periods of hot and dry weather are experienced. The short life cycle and high numberof eggs laid by the pest lead to exponential population increases which can lead to crop devastation in short periods of time, especially ifconditions are favourable and no control measures are taken.

1.3 Management Options

1.3.1 Crop rotation

It is important to avoid other solanaceous plants such tomato, peppers and potatoes in tobacco rotations or on farms where tobacco is grown. Red spider mite also hasweed hostssuch as the night shade, *Solanum nigrum*, which should be timely managed.

1.3.2 Chemical control.

It is recommended that crops be scouted twice a weekand if found to have an infestation, chemical control can then be used. The following chemicals are effective for the management of red spider mite; Dimethoate 40 ec,Emamectine benzoate(Prove® 1.9 EC), Lambdacyhalothrin 5 ec, Solvigo® (Abamectin + thiamethoxam)and Acetamiprid + abamectin.

1.4 Current Work

The TRB is in the process of screening additional newer and/or greener chemicals for the management of this pest.

2. White Mould/Powdery Mildew

2.1 Symptoms

The disease is characterized by powdery white lesions that first appear on the lower leaves, but later enlarge and merge as the infection progresses to leaves up the plant (Fig 2). The fungal mycelium forms numerous conidiophores that bear chains of ellipsoidal conidia which give the powdery appearance. Infected tissues turn dull brown and severe infection leads to leaf chlorosis and premature senescence. Late in the season, tiny pinhead-sized black spherical structures called cleistothecia may appear on infected leaves. Generally, only the lower leaves of early topped plants are infected significantly e.g leaves 1-12 on a plant with 18 or more leaves. They become susceptible progressively from bottom of the plant upwards. Any delay in topping is likely to increase the number of leaves that become infected.

Fig 2. White mould flue-cured tobacco.

2.2 Source and Transmission

Transmission during the season occurs through dispersal of airborne conidia. Fungal spores can survive several years in soil, and it is also possible for the fungus to overwinter on weeds.The prevalence of white mould is dependent on local climatic conditions and warm days accompanied by low humidity and cool nights are favourable.

2.3 Disease Management

2.3.1 Variety Resistance

White mould management has been predominantly based on variety resistance and disease escape, brought about by the absence of conducive weather conditions.Currently, based on their parentage,the open release varieties,K RK 64, K RK 62, K RK 28, K RK 27, K RK 26, K RK 22, K RK66, K M10 and K RK 6 and the limited release varieties T 70,T 71, T 72, T 73 and T 75, have confirmed resistance to white mould. However, it has come to our attention that K RK66 is succumbing to infection and the Plant Breeding Division is currently working to establish the source of the problem.

2.3.2 Site Selection and Rotation

Wind-protected locations (shading, hedges, etc.) are favourable for powdery mildew development and sincespores can survive for long periods in the soil,poor or no crop rotations exacerbate the disease.

2.3.3 Fertility

The powdery mildew fungus grows poorly on K deficient leaves.Excessive N fertilization promotes a dense canopy, sucker growth, and delayed leaf maturity which all create favourable conditions for powdery mildew. Topping will delay infection of upper leaves.

2.3.4Chemical Control

Foliar sprays of the fungicide tebuconazole, available on the market asFolicur® orTebuconazole®) are recommended for the chemical control of the disease. Strobylurins, fungicides such as Azoxystrobin® and Trifloxystrobin® that are registered for the management of Alternaria and frogeye are also reported elsewhere as effective against this disease.

Treatment should start at the first sign of infection or 6-8 weeks after planting when most of the buds are just clear of the heart leaves. Apply treatments immediately after reaping as this allows maximum time between treatments and the next reaping and ensures minimum residues on the leaf. Sprays should not be applied when the crop is wet and should be repeated if rain falls before the spray has dried on the leaf. Both lower and upper sides of the leaf should be sprayed.

2.4 Current Work

The current outbreak has initiated work by the Plant Breeders to examine the nature of the white mould resistance that has been exploited so far and seek alternative sources in order to create buffers against future outbreaks.

Should you require more information, please do not hesitate to contact the Tobacco Research Board's Plant Health Services or Plant Breeding Divisions on telephone 575289-94 or toll free 0 800 4511 and email: rmasukwedza@kutsaga.co.zw.