Plant Bulletin

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Fusarium Yellows In Xiaobaicai

Fusarium Yellows has been noted to occur in most of the vegetable farms in Singapore and is considered a serious disease problem faced by local farmers today. The Yellows, caused by the fungi, *Fusarium oxysporum,* attack many types of Brassica vegetables, including caixin, xiaobaicai, tacai, gailan, and cabbage.

Fusarium Yellows is a soil-borne disease. The fungi enter the plant roots through wounds and invade the plants' vascular systems impeding water flow leading to the wilt symptoms. Toxins produced caused the yellowing in the plant tissues. In Singapore, the disease is observed to be significantly pronounced during hot humid days when preceded by heavy rains.

The first sign of the disease is a slight wilting of the plants. Subsequently, yellowing of leaves occurs, often more noticeable on one side of the leaf blades and stalks (Fig 1a, 1b). Infected leaves may show stunting on the yellowed side (become curved) (Fig 1c). The older leaves usually turn yellow first, and progress upwards to the younger leaves. Severely infected plants wilt and die.

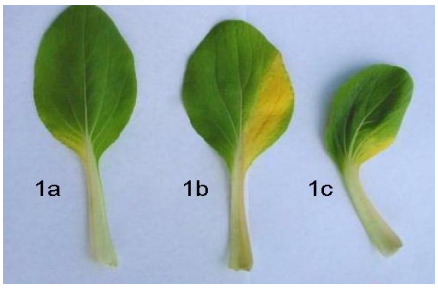

Fig 1: Leaf symptom of Fusarium yellows

Fig 2: Yellows infection in Xiaobaicai

Usually infection is scattered throughout the farm plots with patches of dead plants (Fig 2). The disease can be devastating resulting in severe yield loss. The varieties presently planted are highly susceptible to the disease. The evaluation and selection of likely resistant varieties is being conducted. Research trials are on-going at AVA to evaluate fungicides, biopesticides and soil amendments for the control of the disease.

Meanwhile, farms encountering the disease are advised to follow these measures:

• Crop rotation to non-Brassica types e.g. kangkong, bayam, lettuce etc.

• Plant in well-drained soils. Remove and discard away plants showing the first sign of wilt and yellowing.

• Drench the plant beds with the fungicide, Carbendazim at transplanting and 2 more times before harvest.

More information will be available as soon as research trials provide us with information on better control methods.

Proposed Rules On Use Of Solid Wood Packing Materials For Exports to USA

The United States has proposed to implement rules on the Use of Solid Wood Packing Materials (SWPM) for exports to the USA. These are based on guidelines of the International Plant Protection Convention's (IPPC) "International Standard on Phytosanitary Measures Guideline 15". SWPM is defined as wood packing materials and other loose wood materials used with cargo to prevent damage, including (not limited to) dunnage, crating, pallets, packing blocks, drums, cases, load boards, collars and skids.

The guidelines address the risks involved in the use of SWPM and provide globally accepted measures that can eliminate the risk from quarantine pests associated with wood packing materials. The pine shoot beetle and the Asian longhorn beetle are quarantine plant pests in the US and are considered a serious threat to US agriculture and to its natural, cultivated, and urban forests. These insects have been linked to imports packed in wood harbouring the insects.

The proposed US rules targeted for implementation in January 1, 2004 also recommend treatments for the SWPM as authorised under the IPPC Guidelines. These include a heat treatment or a methyl bromide fumigation schedule. The heat treatment for the SWPM should be in accordance with a specific time and temperature schedule that achieves a minimum wood core temperature of 56°C for a minimum of 30 minutes.

Alternatively, methyl bromide fumigation at 48 g/cubic meter should be applied for 24 hours. A minimum concentration at the end of 0.5, 2, 4 and 16 hours is also specified to be maintained. SWPM that has been treated with one of the approved measures are checked and then marked with an approved international marking by the export country's national plant protection organisation. Such consignments will be allowed entry into the US without further treatment or need for phytosanitary certification.

The Plant Regulatory Branch, AVA (PRB) will administer the SWPM certification and marking system for exports bound for the US in compliance with the IPPC guidelines. PRB will establish the procedures to inspect, register or accredit and audit competent commercial companies that are performing the treatments.

The reference for "International Standard on Phytosanitary Measures Guideline 15 – for Regulating Wood Packaging Materials Used in International Trade" is available at the website :

http://ippc.int/IPP/En/ispm.jsp.

You may also contact PRB's Dr. Mohd Ali at 67519842 or 843 for further information.

Abiotic Influences On Plant Health

Plant pathogens and insects are often thought of as the main causes of plant diseases or the unhealthy state they are in. Plant pathogens are microorganisms such as bacteria, viruses, nematodes and fungi which are also known as biotic or "living" causes of plant diseases. However, equally important to plant health are the abiotic influences, the "non-living" or the environmental factors. Some of the important abiotic influences on plants are light, water, nutrient, soil conditions and the container size.

LIGHT: Photosynthesis is the process whereby plants harvest the light energy to make food for growth and reproduction. It is essential to know your plants' light requirements. Sun loving plants when grown in the shade will have insufficient light and the plants will appear pale and elongated (etiolated) as they cannot synthesize enough food and try to reach out towards the light. Shade and indoor plants have a need for less light. These plants when grown under intense light will also be yellow as their green colour (chlorophyll) is broken down. Brown patches can occur on the leaves, a result of heat scorching.

WATER: Water is an equally essential factor for plant growth and health. Under and over watering plants greatly affects plant health. Both can cause wilt symptoms. When there is insufficient water, the plant dries up. Too much water will drown the roots as they suffocate from a lack of oxygen when the soil pores are filled with water. This will give way to bacterial and fungal attacks leading to root rots. It is best to have a well drained soil but contain some organic matter to retain enough moisture to prevent drying. A layer of algae growth will indicate an excessively wet soil while a hard dry soil points to a lack of water. Related to water is the relative humidity in the plants' environment. Plants grown in low humidity show leaf edge and tip drying. This is common in an indoor air-conditioned environment. This may be rectified by misting the plants often.

NUTRIENTS: Plants draw from the soil or growing media, the essential nutrients for growth and reproduction. The major elements needed are nitrogen (N), phosphorus (P), potassium (K) including others like magnesium, manganese, iron, calcium, zinc etc.. These elements when depleted from the soil are replenished commonly in the form of fertilisers or the addition of organic compounds. When these elements are deficient or present in excessive amounts, plants in such soils will exhibit unhealthy signs such as interveinal chlorosis (Fig 3), bronzing, purpling and stunted growth. Over-fertilising can cause an imbalance in the nutrient levels, pH (acidity/alkalinity) and salt contents. Leaf edge burns can occur. A yearly analysis of the soil will provide a report on the nutrient status available to the plants.

Fig. 3: Magnesium deficiency on leaves

SOIL: Soil and growing media condition the availability of water and nutrients to the plants. The soil texture defines the relative amount of sand, silt and clay content present. The preferred texture would be a loam mix consisting of sand, top soil and organic matter in 1:2:1 ratio. This will allow good drainage as well as reasonable nutrient availability.

CONTAINERS: Plants that have outgrown their containers will appear stunted with roots filling the entire pot or protruding from the drainage holes. Repotting to a bigger pot with fresh soil is recommended. The old and decayed roots may be trimmed off. Repotting enables new growths and remove restraints on the plants.

Therefore, not all plant symptoms are pathogen related. Rather, paying attention to the environmental factors around your plants is just as important to ensuring healthy plants.

Plant Bulletin is published quarterly by the **Horticulture Working Group, Agri-Food and Veterinary Authority**, Sembawang Research Station, 17km Sembawang Road, Singapore 769194.

The aim of this bulletin is to disseminate horticulture and plant health information to plant growers, exporters and importers in Singapore. If you have any suggestions, comments or enquiries, please contact us at :

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