2016

Dry Bean Pest Scouting Report

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INTRODUCTION

A survey of dry bean pests was conducted on farms throughout Vermont during the 2016 season. Plant diseases and insect pests were scouted on five Vermont farm locations in the towns of Alburgh, Cambridge, Danby, Glover, and North Ferrisburg. Unknown disease and insect samples were taken and identified with assistance from the UVM Plant Diagnostic Laboratory (PDC).

PLANT DISEASES IDENTIFIED

The overall warm and dry growing conditions throughout much of the season resulted in relatively low levels of foliar and root diseases. The one exception was purchased seed unknowingly contaminated with Anthracnose that was planted on several farms, which resulted in yield reductions and in one case, complete crop loss. The plant diseases identified during the 2016 growing season are listed by location in Table 1, and descriptions are below:

Table 1. 2016 Plant diseases identified at on-farm scouting locations.

Location	Root rots	Anthracnose	Ascochyta	Common bacterial blight	Bacterial brown spot	Alternaria leaf spot	Mosaic virus
Alburgh, VT	X	X		X	X	X	X
Cambridge, VT		X					
Danby, VT				X			
Glover, VT	X	X	X	X		X	
N. Ferrisburg, VT		X			X		

Root rots were minimal this season due to the warm and dry conditions during seed germination and early plant growth. Root rots were observed at the Glover and Alburgh locations. The early season root rot diseases *Rhizoctonia* spp. and *Fusarium* spp. were identified. *Pythium* spp. is

another root rot disease likely present on bean roots at emergence. Where one of these diseases is observed, it is likely that the others are also present. One will give the others an opportunity to attack, together restricting nutrient and water uptake.

Anthracnose, an easy-to-identify fungal disease had severe impacts on bean yield and quality on certain bean fields this season. While scouting a black turtle dry bean field in Cambridge, VT, plants showing typical anthracnose (*Colletotrichum lindemuthianum)* symptoms were observed on the underside of the foliage. Symptoms included linear, dark/black lesions along the leaf veins (Image 1). Mature circular lesions on pods were surrounded by reddish-brown to black borders with a grayish black interior that exuded pink masses of spores, typically diagnostic for this pathogen. Field samples (leaf and pods) suspected of being infected, were taken to the UVM Extension PDC for further microscopic examination. Based on morphological analysis, the pathogen was identified as *Colletotrichum* spp. In addition to the Cambridge location, Anthracnose was positively identified in Glover, Alburgh, and N. Ferrisburg fields.

Image 1. Typical symptoms of bean Anthracnose collected at the Cambridge field (A). Leaf underside with dark lesions along veins (B). Circular pod lesions with gray-black centers (C) and distinctive interior of the lesion exuding tan to pink/salmon masses of spores (D).

Interestingly, while screening pods for anthracnose, another pathogen was detected on the surface of some examined pods from the Glover location. Microscopic examination revealed the fungus to be *Ascochyta* spp. Small black pycnidia were observed on dark brown sunken lesions of some of the pods. Cultivars 'Tiger's Eye', 'Yellow Eye' and 'Black Turtle' were determined to be infected with *Ascochyta* spp. based on morphological characteristics such as presence of pycnidia, absence of setae and conidia (Image 2). Ascochyta was only positively identified at the Glover location but it is likely additional locations had some level of infection as well.

Image 2. Signs of Ascochyta pod blight. Cultivars Tiger's Eye (right) and Black Turtle (left). Sunken lesions with dark center visible. Detail of concentric rings of small pycnidia (dots) developing in the center of lesions were the main diagnostic characteristic (right).

Common bacterial blight (*Xanthomonas axonopodis* pv. *phaseoli*) was found at the Alburgh, Danby, and Glover locations (Image 3). This plant pathogen is often a secondary infection. We observed that the severity of common bacterial blight infection coincided with the severity of Potato Leafhopper damage.

Alternaria leaf spot (*Aternaria alternate*) was recorded at the Alburgh and Glover locations (Image 4). This plant pathogen will overwinter on crop residue and weed debris therefore, it is important to rotate your crops to minimized infection from this disease.

Image 3. Common bacterial blight (*Xanthomonas axonopodis* pv. *phaseoli*), Alburgh, VT.

Image 4. Alternaria leaf spot (*Alternaria alternate*), Alburgh, VT.

IPM (Integrated Pest Management) Tactics for Managing Plant Disease:

Critical practices to managing the multitude of diseases that impact dry bean yield and quality include planting high quality seed that is free of disease, rotating crops, and improving airflow. We highly recommend buying "certified" seed when possible. Certified seed guarantees that the seed meets or exceeds a strict set of quality control standards. In the case of beans, this includes rigid standards on seed diseases. Several diseases like bacterial blight and anthracnose can be transmitted by seed. Weed management is especially important to improve airflow and assist with keeping the bean plant canopy as dry as possible. A dry canopy can help minimize the infection of disease. Spores from many of the fungal diseases can survive in the soil for 3 to 5 years waiting for their host plant and/or ideal conditions. Therefore, crop rotation and healthy soil is critical to minimizing diseases present during bean production.

Overall, bean pods scouted for disease during the 2016 growing season exhibited several deformities and discoloration from plant diseases, however for the most part the beans inside appeared largely uninfected.

In general, growers reported "above average" yields in 2016, the one exception were those farmers who planted the Anthracnose contaminated black bean seed. In those fields, there was a reported 60-100% loss.

***Insect Pests*:**

The primary insect pest, Potato leafhopper (*Empoasca fabae*), was identified at all the on-farm locations except for N. Ferrisburg (Table 2, Image 5). Minor damage from thrips was also recorded at the Alburgh and Glover sites.

Image 5. Potato leafhoppers on Heirloom dry beans, Alburgh, VT.

Large populations of potato leafhoppers were blown north in storms from the south. The mild winter likely led to high overwintering populations elsewhere leading to more moving upwards to the northeast. This resulted in an explosion of potato leafhoppers that caused severe injury to certain dry bean varieties. Potato leafhoppers feed with piercing-sucking mouthparts on host plant vascular tissue. This restricts phloem and eventual xylem flow to the rest of the leaf, resulting in leaf edge yellowing and curling. Visual damage caused by potato leafhopper is called "hopperburn" (Image 6). Because dry beans are planted in late spring, they can "escape" the first generation of leafhoppers. As the season progresses, future generations of leafhopper may

Image 6. Dry bean "hopperburn", Alburgh, VT.

jump over to feed on other broadleaf crops such as dry beans, alfalfa, hops, raspberries, and grapes. Interestingly, Hutterite Soup, Kenearly Yellow Eye, and Tongues of Fire appeared to be particularly susceptible to leafhopper damage whereas Light Red Kidney and Peregion were relatively resistant. As a result of the leafhopper damage "hopperburn", we saw an increase in secondary plant disease infections, primarily common bacterial blight.

Table 2. Insect pests identified at on-farm scouting locations

Location	Potato Leaf-hopper	Thrips
Alburgh, VT	X	X
Cambridge, VT	X	
Danby, VT	X	
Glover, VT	X	X
N. Ferrisburg, VT		

IPM Tactics for Managing Insect Pests:

IPM programs in other crops include weekly monitoring of the populations. In dry beans, scouting the underside of three leaves/plant in each variety is recommended weekly. Potato leafhoppers have feeding preference for different varieties. Feeding preference is not known for all heirloom varieties; farm observation will become necessary to select bean types that may be less susceptible. In most years, beneficial arthropods can greatly diminish leafhopper populations. However, in years with severe outbreaks, other control options may be required. Insecticide application is an option, especially in years of severe infestation; however, options are limited for organic growers. The OMRI approved products with azadirachtin or pyrethrin as active ingredients are effective against potato leafhopper. Products with active ingredients beta-cyfluthrin or imidicloprid are used for potato leafhopper control under conventional management. As always, pesticides used must be registered for use on beans in your state. Read and follow pesticide labels carefully. Be very aware that broad-spectrum insecticides kill natural predators and often lead to secondary outbreaks of other pests such as two-spotted spider mite.

USDA United States Department of Agriculture National Institute of Food and Agriculture

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