

## Potato Bacterial Disease Surveillance in Kenya - Explanatory note #3

In 2019/20 CABI and KEPHIS conducted an extensive survey on potato diseases most notably on blackleg, a "wilting disease" caused by a complex of bacteria, including *Pectobacterium* and *Dickeya* spp. This group of bacteria is sometimes referred to as the "Erwinia complex", and can be transferred by tubers but also by water, insects, wind and rain. The full report of 157 pages is available as PDF. In addition a series of what we call the "Explanatory notes" is published and disseminated to stakeholders in the Kenya potato sector, to make the often very technical details in the report more accessible.

This paper explains the implications of the survey results for potato production in Kenya and how to minimize impact. The "Explanatory notes" and the full CABI/KEPHIS potato disease surveillance report can be found on the following web page: [https://www.wur.nl/en/Research-Results/Research-Institutes/centre-for-development-innovation/show-cdi/seed\\_potato\\_phase3.htm](https://www.wur.nl/en/Research-Results/Research-Institutes/centre-for-development-innovation/show-cdi/seed_potato_phase3.htm)

### Implications of "Erwinia" for potato production

In this paper we will have a closer look at risks of "Erwinia" for potato production in Kenya, and especially at what can be done to minimize a negative impact. This bacterial disease is also known as "blackleg" and "soft rot". It can cause wilting of potato plants with the bottom of the stems turning black. This explains the popular name "blackleg". As the bacteria can be responsible for tuber rot in storage, the name "soft rot" is also used. The disease will easily spread, but if wisely addressed, it should not have much negative impact on yield and quality of potatoes.

The disease is caused by a group of related bacteria of the "*Erwinia complex*". Though scientists may have given each type a different name, the symptoms in the field are very similar. In the field it is not possible to distinguish between the different types. Distinction is only possible by using advanced laboratory techniques such as PCR. Some of the scientific names used for these bacteria are: *Dickeya solani*, *Pectobacterium carotovorum ssp atrosepticum*, *Erwinia carotovorum*. From time to time new types develop; they may increase in importance and later disappear again when a new type appears. As explained already, the symptoms will be similar. Implications are the same.

### Erwinia is highly infectious and can spread everywhere

Contaminated seed tubers can pass on the infection to the next crop. In addition Erwinia can be transmitted by many other ways such as water, air, and even by insects. Another possible source is machinery, but also workers and their tools in the field. Even when 100% clean seed potatoes are used and much attention is given to hygiene, infections are hard to avoid. In many cases it will not be possible to trace the first source of the infection. Humid conditions are favourable for Erwinia and the development of symptoms.

As Erwinia spreads so easily it is not surprising that this disease is now present in all potato production regions in the world. Once the disease is established in a country, it will be impossible to eradicate it completely. Fortunately it is very well possible to control the distribution and to reduce the impact of the disease.

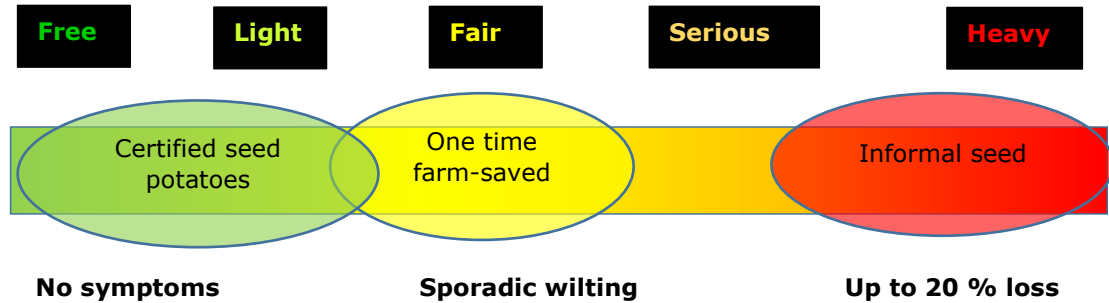
### Impact of blackleg can be controlled

The good news is that most new infections with Erwinia bacteria do not immediately cause disease symptoms. This first stage is called a "latent" infection. When the bacteria are passed on to the next generation, the number of bacteria may gradually increase. Only when after several generations the density of bacteria exceeds a certain threshold, plants will start to show the disease. This means that even with an Erwinia bacterial infection, the production of a good crop is very well possible. Most important is to keep the infection density low!

How can we achieve this? Key solution is the use of certified seed. Such seed may contain some Erwinia bacteria, but it will be in such low density that there will be no or only very few diseased plants. A following generation of farm-saved seed, grown from this certified seed, could contain a few more diseased plants. Provided diseased plants will be removed, the farm saved seed will still be of acceptable quality and certainly far much better than a potato crop from informal seed.

The graph below shows a scale from low infection level (green) till high (red) with the corresponding symptoms in the field.

## ***Degree of infection with Blackleg bacteria***



### **How to control the distribution of the disease?**

A few recommendations from the CABI Surveillance report (October 2021):

1. Always use certified seed;
2. Apply a minimum of 1 to 3 crop rotation;
3. Remove volunteer plants and wild hosts as much as possible by proper weed control;
4. Never cut seed to be planted for seed production, and discourage cutting seed for ware potato production;
5. Rogue and properly destroy diseased plants as from early in the season (starting as early as you can see symptoms);
6. Harvest carefully under dry conditions and store properly under cooled conditions.

Note: Do not use pesticides to combat the target pathogens as they are ineffective against bacterial pathogens.

### **Conclusion**

The message is clear. Kenya needs more certified seed to minimize the impact of blackleg. This will not only benefit the control of this bacterial disease but also reduce the spread of other potato diseases such as viruses that are often much more harmful. Here lies the key towards an abundant production of potatoes of high quality at affordable price.

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