Potato diseases and their control

Lecture 14

- Control strategy depends on the phytosanitary state, which, in the turn, based on the results of *monitoring*.
- Monitoring include: *diagnosis* of diseases and their *assessment*.

Fungal diseases

- **Late Blight**
- **Early Blight**
- **Wart Disease**
- **Wilt**
- **Black Scurf**
- **Silver scurf**
- **Powdery scab**
- **Dry rot**

- Фітофтороз
- Альтернаріоз
- Рак
- В‘янення
- Чорна парша
- Срібляста парша
- Порошиста парша
- Суха гниль

Late Blight – *Phytophthora infestans*

Management:

Cultural control: the three main aspects are
hygiene, choice of variety and fertilization levels.

Chemical control:

The first application for *late blight* should be made just prior to row closure. Continue spraying at 7 days intervals.

Early blight – *Alternaria solani*

Management:
Chemical control
The best timing for *early blight* varies from year to year, based on temperature. Forecasts based on P-days (physiological days)have been used to improve the timing for applying fungicides.

Wart Disease – *Synchitrium endobioticum*

Management:

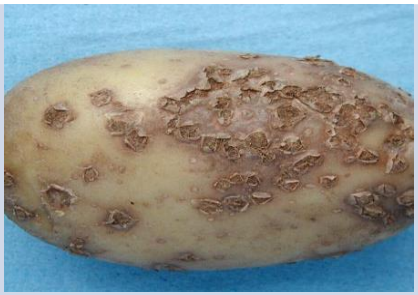
1. Quarantine;
2. Disinfection of soil from cysts (growing the non-host plant provoking the cyst germination)

Wilt – *Verticillium spp., Fusarium solani*

Management:

1.Crop rotation

Scubs

Black Scurf	***Rhizoctonia solani***	
Powdery scab	*Spongospora subterranea*	
Silver scurf	*Helminthosporium solani*	

Management:

Chemicals available for the control of ***Black scurf***.

Azoxystrobin (Amistar) can be applied to the soil at planting to reduce the incidence of the disease.

Dry rot – *Fusarium solani*

Management:

1. Storage condition: t = 2-4C, humidity – 90%

Bacterial diseases

- **Blackleg**
- **Ring rot**
- **Bacterial wilt**
- **Common Scab**
- **Mycoplasma (phytoplasma)**

- Чорна ніжка
- Кільцева гниль
- Бактеріальне в‘янення
- Звичайна парша
- стовбур

Blackleg	*Pectobacterium carotovorum* =*Erwinia carotovora*	
Bacterial wilt	*Ralstonia solanacearum*	
Ring rot	*Corynebacterium michiganensis subsp. sepedonicus*	

Stolbur - mycoplasma

Common Scab - *Streptomyces scabies*

Management:

1. Maintain soil at a low pH.
2. Irrigate dry or sandy soils for six weeks after tuber initiation.
3. Good crop rotation is also of benefit.
4. There is no chemical control.

Control of bacterial diseases

- Cultivar resistance
- Biological control

There is no chemical control

Viral and viroid diseases

- **Potato mosaic virus**
- **Latent and Mild Mosaic Viruses**
- **Potato leafroll virus (PLRV)**
- ***Potato spindle tuber viroid* (PSTV)**

- Крапчаста мозаїка
- Зморшкувата мозаїка
- Скручування листків
- Готика

potato mosaic virus

Latent and Mild Mosaic Viruses

***Potato leafroll virus* (PLRV)**

Potato spindle tuber viroid (PST

Management:

1. Producing healthy seed potato tubes;
2. Vectors control

Nematodes

Globodera rostochiensis, G.pallida

Ditilenchus destructor, D.dispaci

Control:

1. Quarantine
2. Cultivar resistance
3. Crop rotation

Potato diseases and their control

1. Common/cultural measures
2. Cultivar resistance
3. Chemical control
4. Producing healthy seed (potato tubes)
5. Quarantine

Common/cultural measures

- Crop rotation (Potatoes should not be grown more than one year in four in a rotation).
- Appropriate fertilizer applications (Potatoes need significant amounts of N, P, and K (potassium) nutrients and in some cases additional trace elements).
- Weed management, removing volunteers and alternative hosts (Potatoes must be protected against competition from weeds. Use a herbicide or combination of herbicides to keep weeds under control).
- Controlling debris in the field (Haulm (бадилля) destruction)

Chemical control

- Acrobat®(metalaxil) effective against *late blight*
- Ridomil® Gold (mefenoxam/metalaxil M + mancozeb), Amistar (strobilurin), Quadris® (strobilurin) and Reason®(fenamidone) are effective against both *early blight* and *late blight*

Fungicides are used to prevent **blights** (*early and late blights*).
The first application for *late blight* should be made just prior to row closure. Continue spraying at 7 days intervals.

Potato quarantine diseases

- **Potato cyst nematode**
- **Potato wart disease**

Producing healthy seed potato tubes

- The potato is propagated vegetatively and seed potato tubes degenerate from continued multiplications and the accumulations of pathogens (viruses), from one generation to the next.

7 Steps in Potato Micropropagation

- ***Step 1.*** *Tubers are allowed to sprout in the laboratory.*
- ***Step 2.*** *Sprouts are removed from the tuber and surface-sterilized.*

The meristem (tissue at the growing point of all plants and free from pathogens) is cut from the sprout tip under a dissecting microscope and transferred to a liquid growth medium.

- ***Step 3.*** *The meristem develops to form a microplant.*

- **Step 4.** *The microplant is cut to give nodal cuttings (відрізки з зародковими вузлами).*

- **Step 5.** *Nodal cuttings are planted in solid growth medium. Each nodal cutting produces a new microplant. Step 4 is repeated until the required number of microplants is produced.*

- **Step 6.** *Microplants are transplanted into soil-free compost in a glasshouse and allowed grow for up to 100 days.*

- **Step 7.** *Minitubers are harvested, stored in a cold room and sold on to seed growers the following spring.*