



Teagasc Disease Seminar

1st February 2022

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What are you in for over the next 25 minutes

- Main 'leaf spot' diseases and options for control.
- Oomycete diseases and options for control.
- Fungicide programmes for foliar disease
- Soil-borne diseases
- Virus diseases
- Storage diseases



Brassica Leaf Spots

Ringspot (*Mycosphaerella brassicicola*)

- Inoculum can be seed, or airborne.
- Concentric rings of pycnidia (spore fruiting bodies)
- Definite lesion margin
- Favoured by cool, wet conditions (August – end November). Temps >10°C.



Brassica Leaf Spots

Light Leaf Spot (*Pyrenopeziza brassicae*)

- Airborne inoculum coming from infected leaves/debris
- Lesions occur as very diffuse white spots due to spore masses; these give way to light/dark brown lesions
- Infection favoured by cold, very wet conditions. October – February (100 hours leaf wetness, $>4^{\circ}\text{C}$)
- Most commonly seen as a 'smudgy' finger print.
- Triazole resistance, particularly tebuconazole in Scotland and N England



Brassica Leaf Spots

Dark Leaf Spot (*Alternaria brassicae/brassicicola*)

- Inoculum can be seed or airborne
- Can cause damping off of seedlings
- Dark brown spots on leaves become larger lesions with yellow margins and necrosis
- Favoured by warm, wet conditions (July-Oct)



Brassica Leaf Spots

Phoma Leaf Spot (*Phoma lingam*)

- Inoculum can be seed, soil or air borne.
- Light tan leaf spots with black dots (pycnidia) randomly scattered across the lesion.
- Canker may develop as a dry rot on plant stems or on cut stalks in stored cabbage
- Favoured by mild, wet conditions (July – Oct)

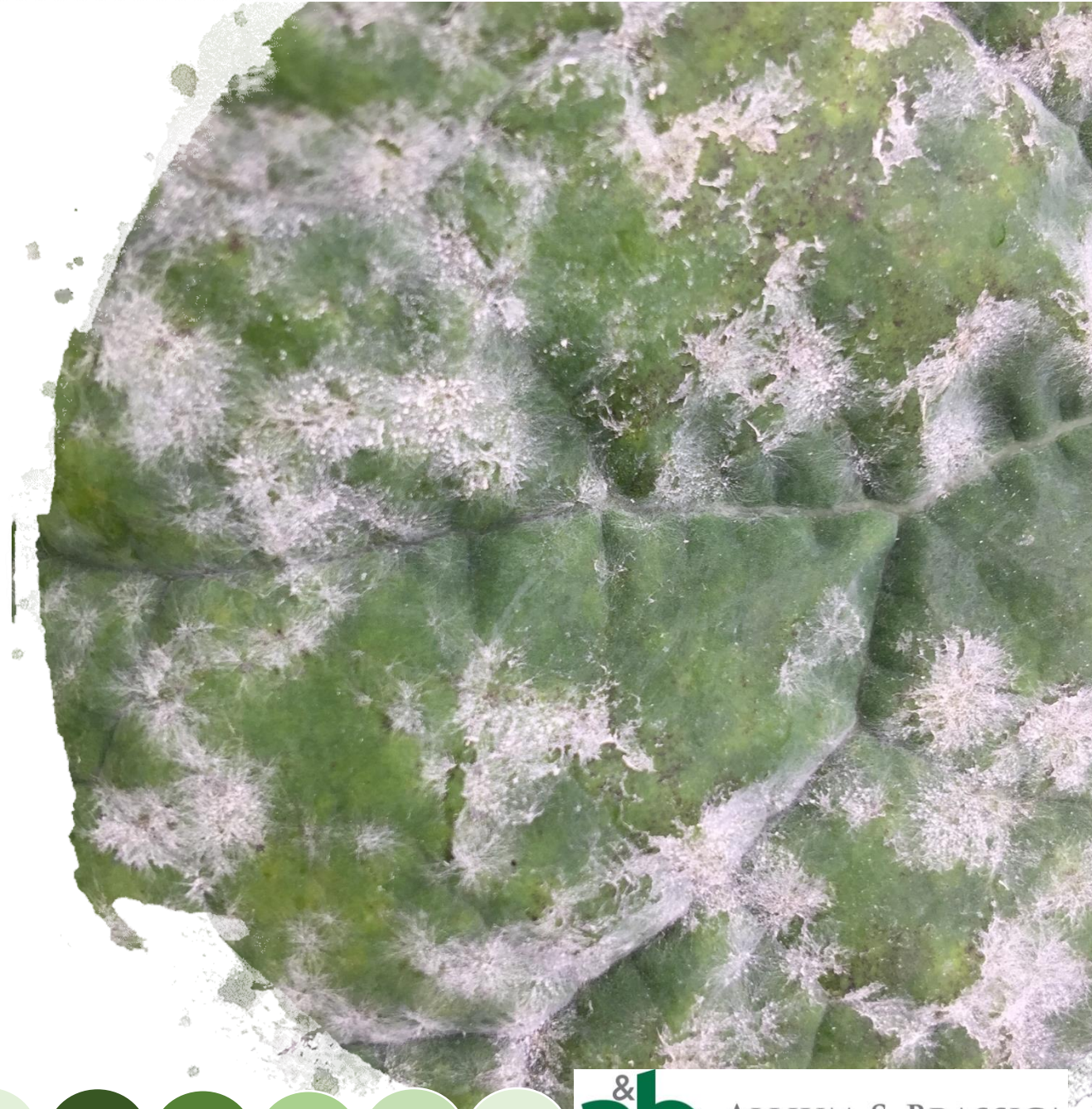


Brassica Leaf Spots

Powdery Mildew (*Erysiphe cruciferarum*)

- Star-shaped, white lesions usually on upper leaf surface
- Lesions usually merge and leaf surface appears dusted with a white powder
- Infection favoured by warm, humid conditions, but disease development occurs best under low RH (July to November)

Powdery Leaf Spot is NOT a leaf spot but most leaf spot fungicides will give some control



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Brassica Leaf Spots – Fungicide Options

Protectant Fungicides

Amistar (Azoxystrobin - AZ) – 2 x 1L/ha, 14d HI.

Eradicant Fungicides

Rudis (Prothioconazole) 3 x 0.4L/ha, 21d HI

not kale/collards

Score 250EC (Difenoconazole -DFZ) – 2 x 0.5L/ha, 21d HI

Signum (Boscalid/Pyraclostrobin) – 3 x 1kg/ha, 21d HI

Perseus (Fluxapyroxad + DFZ) – 3 x 1L/ha, 14 d HI

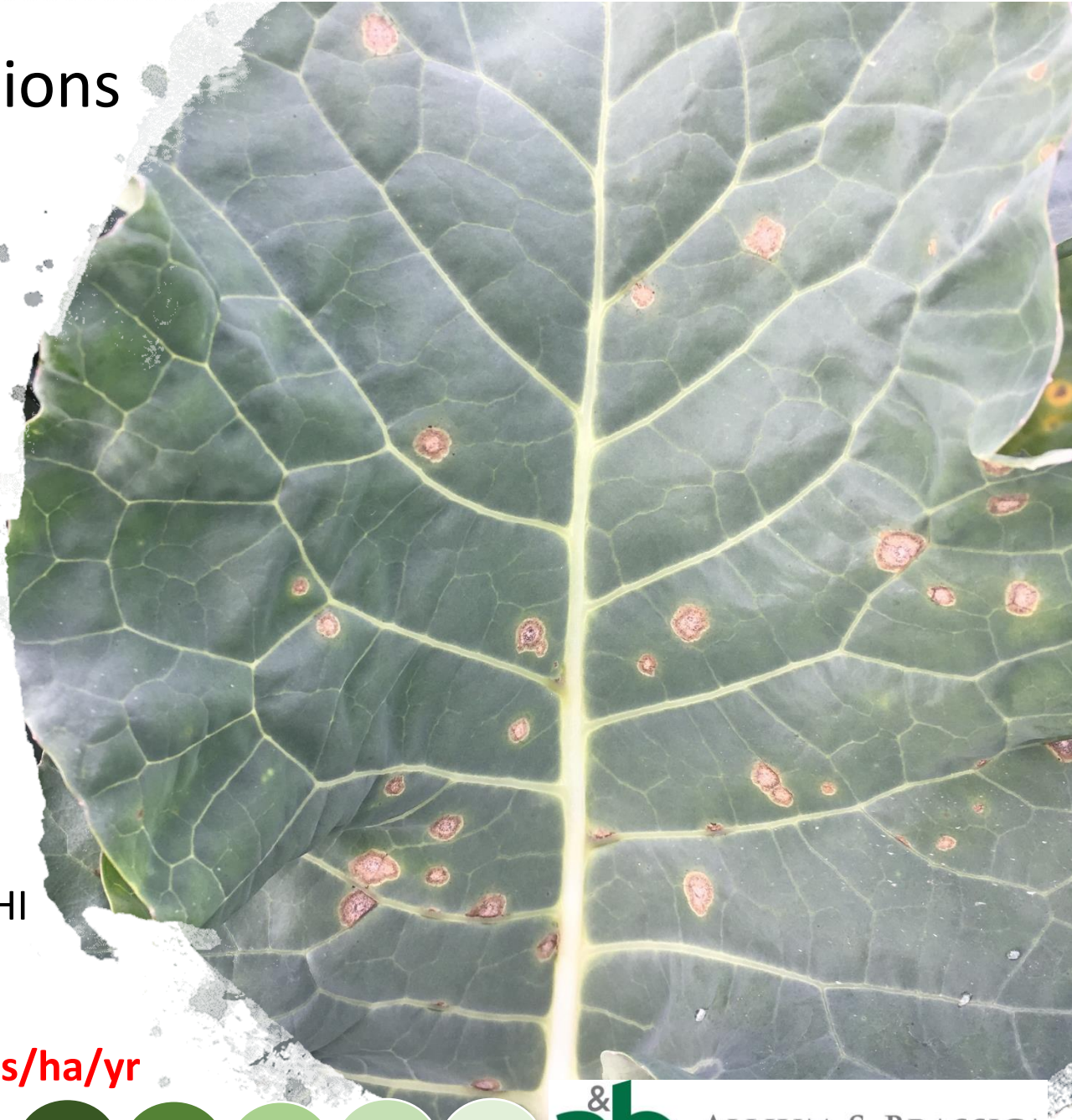
not kale/collards

Amistar Top (DFZ + AZ) 2 x 1L/ha, 21d HI

Nativo 75WG (TBZ + Trifloxystrobin) 3 x 0.36kg/ha, 21d HI

not kale/collards

Az restricted to 500g as/ha/yr. DFZ restricted to 250g as/ha/yr



Brassica Oomycete Diseases

White Blister (*Albugo candida*)

- Widespread on crucifers
- Characteristic disease with chalky, blister like pustules
- Favoured by warm, humid but not wet conditions.
- July to October



Brassica Oomycete Diseases

Downy Mildew (*Peronospora parasitica*)

- Upper leaf surface shows irregular brown/black areas
- Under surface covered with white to grey fluffy mould
- Favoured by cool, moist conditions (August to November)
- Sporulation occurs at night



Brassica Oomycete Fungicide Options

Protectant Fungicides

Amistar (Azoxystrobin) – 2 x 1L/ha, 14d HI

Eradicant Fungicides

Infinito (Fluopicolide + propamocarb H)
– 1 x 1.6L/ha, 14d HI.

SL567a (Metalaxyl-m) – sprouts, cabbage and cauliflower only. 3 x 0.16l/ha, 14d HI.

Revus (Mandipropamid) 2 x 0.6L/ha, 14d HI.
broccoli, cauliflower and sprouts only



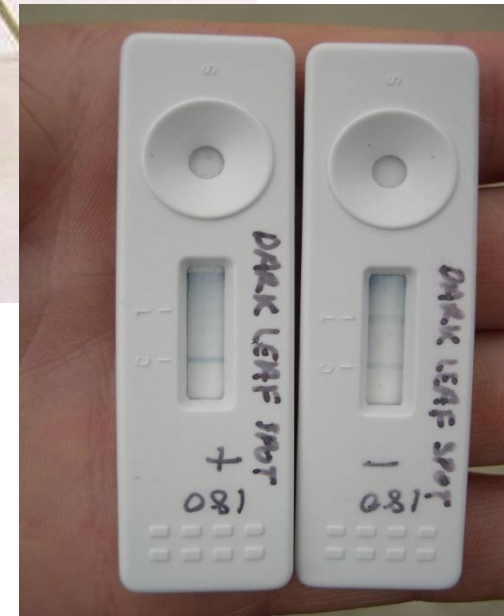
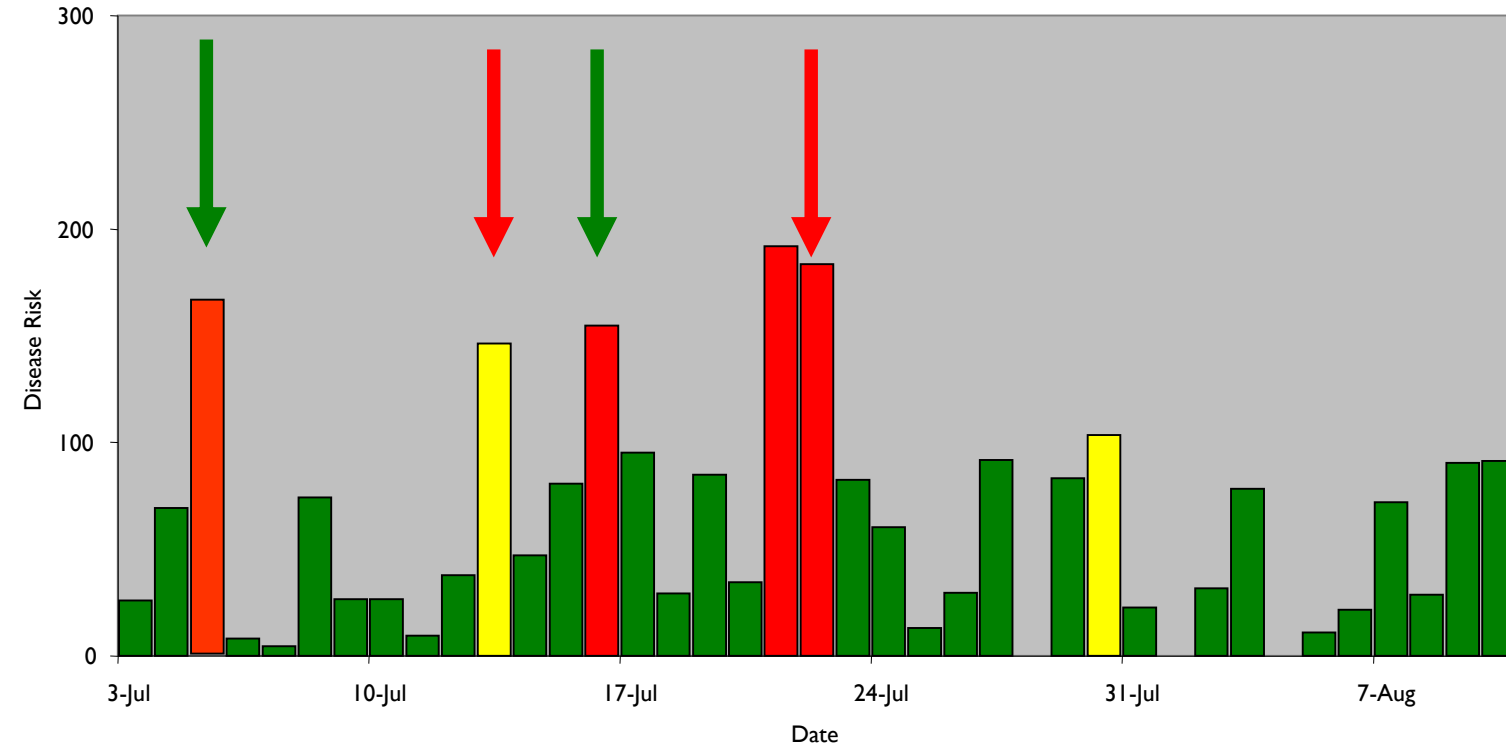
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Airborne disease forecasting

Ringspot, Light Leaf Spot, Dark Leaf Spot, Powdery Mildew

<https://www.syngenta.co.uk/brassica-alert>

Friskney Ringspot/Alternaria Risk (Week Ending 13th August 2007)





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Broccoli Disease Programme

- Typically no fungicides applied unless for white blister or systemic downy mildew.
- White blister – SL 567a, Signum, Infinito
- Systemic downy mildew

Timing	Product	Rate	Water rate	Comments
4 weeks post plant	Amistar	1 L/ha	300 L/ha	Include a foliar phosphite such as Farmfos/Force
10 -14 days later	Revus OR Infinito + Phase II	0.6L/ha OR 1.6L/ha	300 L/ha	Before head visible MRSO needed to ensure penetration. 14 day HI



Cauliflower Disease Programme

- Typically no fungicides applied to summer/autumn cauliflower unless for white blister or downy mildew
- White blister – Amistar + SL 567a
- Downy mildew – Infinito or Revus
- Autumn/winter cauliflower



Timing*	Product	Rate	Water rate	Comments
End September	Amistar Top	1 L/ha	300 L/ha	Include appropriate fungicide if white blister/downy mildew present.
Mid October	Rudis	0.4 L/ha	300 L/ha	Include appropriate fungicide if white blister/downy mildew present.

** Guide only adjust to suit crop growth stage/anticipated harvest and disease pressure*

Kale Disease Programme

- White blister – Amistar + SL 567a
- Powdery mildew – Potassium hydrogen carbonate (Karma) 8 x 3kg/ha, 1d HI

Timing*	Product	Rate	Water rate	Comments
Mid August	Signum + NIW	1 kg/ha	300 L/ha	Include appropriate fungicide if white blister/downy mildew present.
Early September	Amistar Top	1 L/ha	300 L/ha	
End September	Signum + NIW	1 kg/ha	300 L/ha	
Mid October	Amistar Top	1 L/ha	300 L/ha	
Early November	Signum	1 kg/ha	300 L/ha	

* *Guide only adjust to suit crop growth stage/anticipated harvest and disease pressure*

Brussels sprouts Disease Programme

- White blister – SL 567a
- Powdery mildew – Potassium hydrogen carbonate (Karma) 8 x 3kg/ha, 1d HI or swop Amistar Top for Perseus

Timing*	Product	Rate	Water rate	Comments
End July	Amistar Top	1 L/ha	300 L/ha	Include appropriate fungicide if white blister present.
Mid August	Rudis	0.4 L/ha	300 L/ha	
Early September	Signum + Activator 90 (NIW)	1 kg/ha 0.2 L/ha	300 L/ha	
Late September	Nativo 75WG	0.36 kg/ha	300 L/ha	
Mid October	Rudis	0.4 L/ha	300 L/ha	
Early November	Amistar Top	0.4 L/ha	300 L/ha	

* *Guide only adjust to suit crop growth stage/anticipated harvest and disease pressure*

Cabbage Disease Programme

Storage cabbage

Timing*	Product	Rate	Water rate	Comments
End July	Signum + NIW	1 kg/ha	300 L/ha	Include SL 567a if white blister present.
Mid August	Rudis	0.4 L/ha	300 L/ha	
Early September	Nativo 75WG	0.36 kg/ha	300 L/ha	
Late September	Rudis	0.4 L/ha	300 L/ha	
Mid October	Signum + NIW	1 kg/ha	300 L/ha	
Early November	Rudis (if needed!)	0.4 L/ha	300 L/ha	

Autumn/winter cabbage

Timing*	Product	Rate	Water rate	Comments
Early September	Amistar Top	1 L/ha	300 L/ha	Include SL 567a if white blister present.
Late September	Nativo 75WG	0.36 kg/ha	300 L/ha	
Mid October	Rudis	0.4 L/ha	300 L/ha	
Early November	Amistar Top	1 L/ha	300 L/ha	

Brassica Bacterial Diseases

Xanthomonas (*X campestris pv campestris*)

- Predominantly seedborne and spread during propagation.
- Characteristic yellow V shaped lesions occur from the leaf edge. Veins within the lesion turn black.
- Infection favoured by warm, wet conditions

Control – Predominantly cultural : nutrition, variety selection, rotation and separation. Strobilurin/triazole mixes can reduce disease incidence by keeping leaves healthy



Brassica Bacterial Diseases

Spear Rot (*Pseudomonas flourescens*)

- Mainly problematical in June and September/October.
- Infected areas start off with flowerbuds yellowing. Followed by browning of tissue and characteristic smell.

Control – Predominantly cultural : nutrition, variety selection, rotation and separation.



Brassica Soil-borne Diseases

Clubroot (*Plasmodiophora brassicae*)

- Affects all crucifers and cruciferous weeds ie. Shepherds Purse, Charlock.
- First symptoms are plants wilting usually in discrete areas.
- Upon lifting affected plants the roots are swollen and distorted.
- Resting spores are tough and remain viable for 20 years.

Control – Predominantly cultural : Varietal resistance, rotation, improve drainage, lime to pH 7.5, Limex & Perlka (calcium cyanamide)



Brassica Virus Diseases

Three main diseases:

- **Turnip Yellows (TuYV)** – most significant. Largely symptomless but can cause significant yield loss
- **Turnip Mosaic Virus (TuMV)** – reasonably common, obvious symptoms (circular irregular symptoms on leaves).
- **Cauliflower Mosaic Virus (CaMV)** – relatively rare
- All aphid transmitted largely by *M. persicae*

Control – rotation and separation, good hygiene, prompt control of aphids both in field and propagation.



Brassica Virus Diseases

Turnip Yellow Virus (TYV) can cause severe stunting of plants.



Brassica Virus Diseases

Turnip Yellow Virus (TYV) can cause 'tipburn' symptoms in stored cabbage.



Brassica Virus Diseases

Turnip Mosaic Virus (TuMV) can cause cigar-burn internally on stored cabbage



Brassica Storage Diseases

Botrytis Grey Mould, Phytophthora

Control – Predominantly cultural : Good hygiene, careful handling, correct storage temperatures.

In the UK we drench with **Serenade ASO** after harvest. 600ml/tonne in 20L water.

