

Management of *Ascochyta* blight and other foliar diseases in chickpeas: Fundamental concepts



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Foliar disease management in chickpeas

Avoid growing Kabuli-type chickpeas in regions with wet climates.

The varieties developed in the Pacific Northwest are extremely susceptible to Ascochyta blight when grown further east.

The varieties with partial resistance to Ascochyta blight developed in the Northern Plains develop a very dense canopy when moisture is not limiting. **When the climate is wet, Botrytis and Sclerotinia develop in the interior of the canopy** and the canopy gets so dense that it impossible (even with optimal fungicide droplet size) to achieve satisfactory management of these diseases in the interior of the canopy.

Foliar disease management in chickpeas

Botrytis:



Sclerotinia (white mold):



Ascochyta blight management in chickpeas

1. Clean seed and fungicide seed treatment

Seed treatment reduces seed-to-seedling transmission of *Ascochyta* but does not eliminate it. Efficacy data on the comparative efficacy of fungicide seed treatments against seedborne *Ascochyta* are limited. Thiabendazole (an active ingredient in Mertect and Vibrance Maxx Pulses) has long been utilized and is known to have acceptable efficacy.

2. Extended crop rotation intervals

Minimum 3 years out of chickpeas

3. Appropriate selection of varieties

Plant only less-susceptible varieties; avoid varieties such as Sawyer, Royal, and Sierra. In wetter regions and in wetter fields, plant a more determinate variety (e.g. CDC Leader) that, with timely planting, will senesce in August even if there is cool, wet weather in late summer.

4. Foliar fungicides

Make sure you apply an effective fungicide; large differences in efficacy exist among registered products, and resistance has developed to all FRAC 11 (QoI) and some FRAC 7 (SDHI) fungicides.

Ascochyta blight management in chickpeas

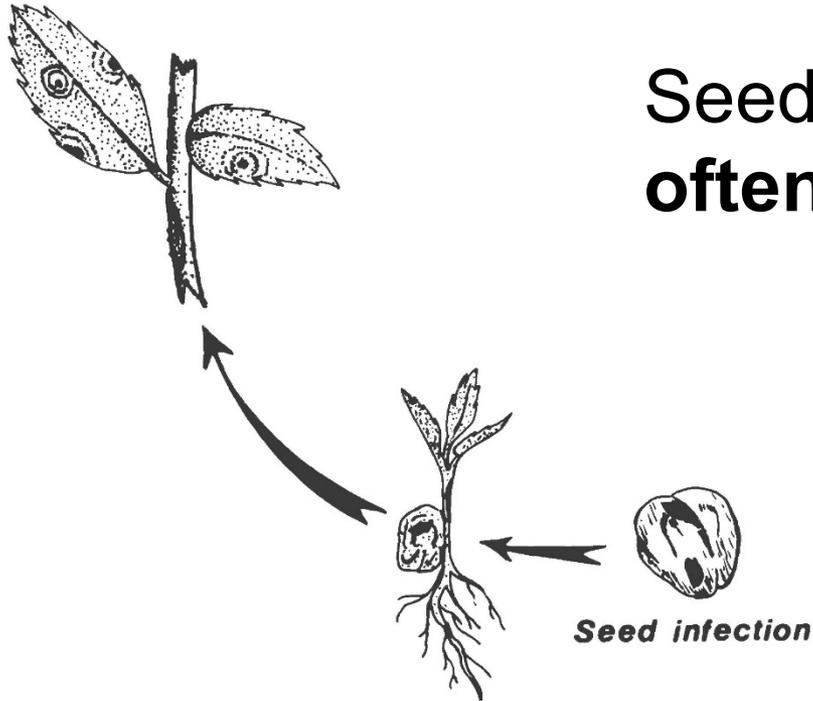
Fungicide application timing:

- First appearance of disease symptoms or bloom initiation, whichever occurs first.
- Apply prior to bloom initiation only if conditions are highly favorable for Ascochyta (recurrent rains)
- Unless conditions are highly unfavorable for Ascochyta, apply at bloom initiation even if you cannot find any disease.
- Apply every 10-14 days as long as rains persist until the crop begins to senesce
- The interval between applications can be extended if it is not raining. If the application interval exceeds 14 days, be certain to apply before the next forecasted rain.

Initial introduction of *Ascochyta* blight

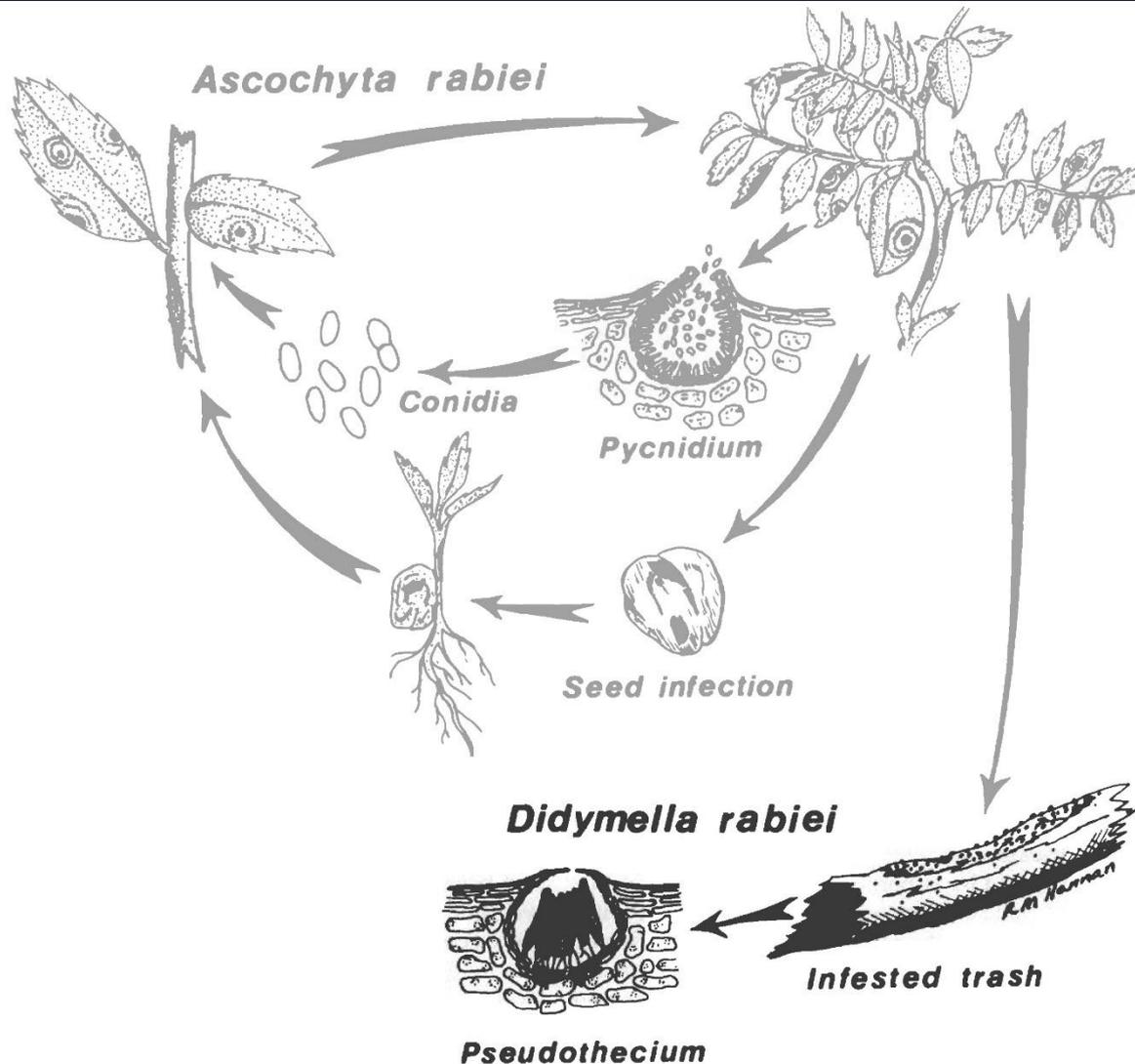
Transmission of disease from infected seed to seedlings.

Seeds within diseased pods are often infected with *Ascochyta*



Long-distance movement of *Ascochyta*

Spores produced on overwintered crop residues



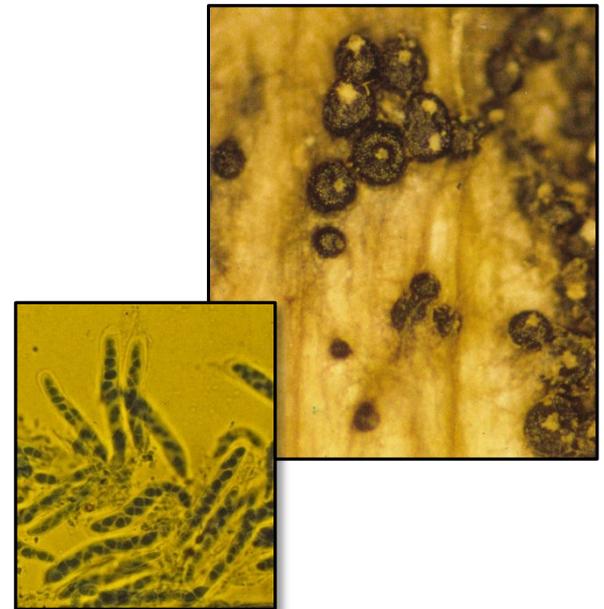
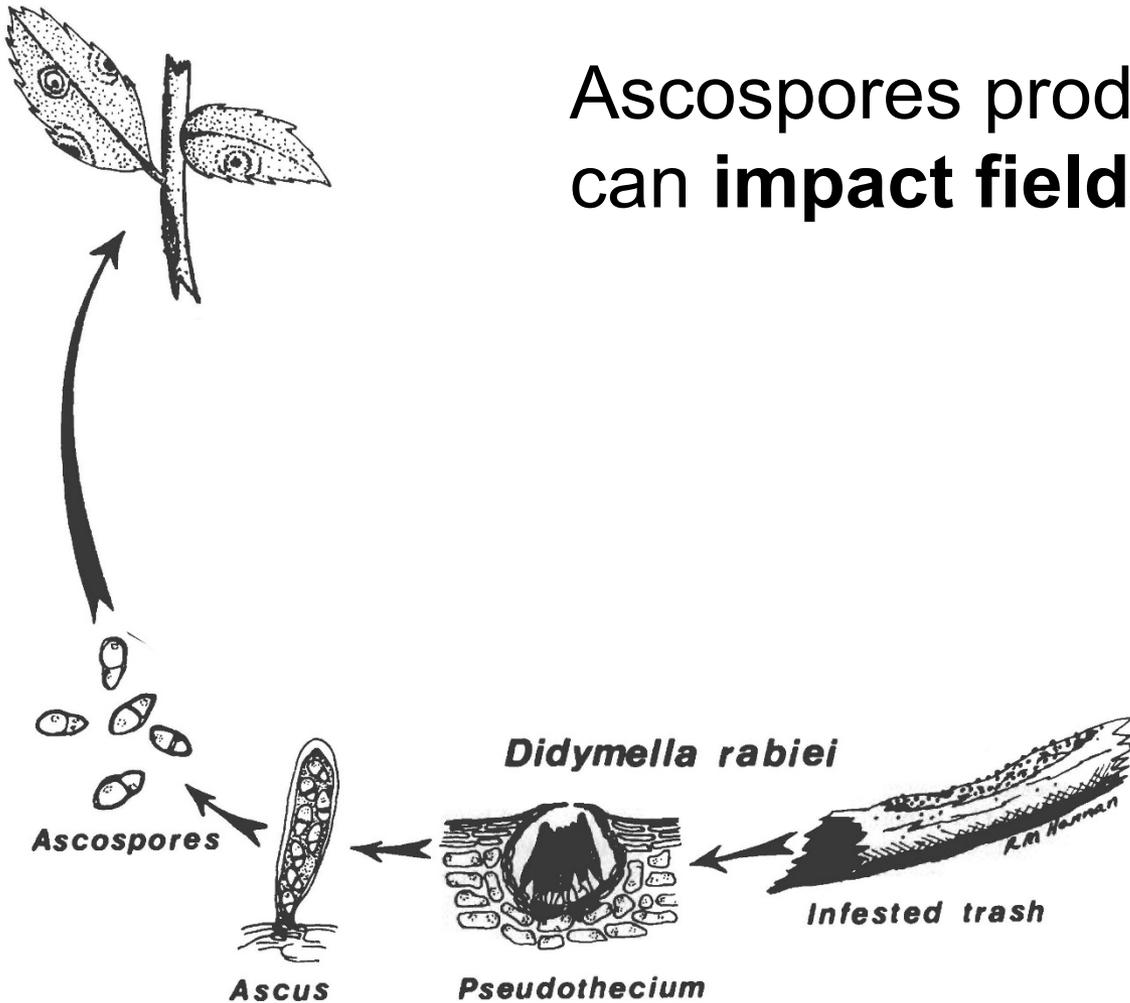
Sexually produced ascospores are produced on overwintered infested residues.

Can be **carried aloft by air currents**

Long-distance movement of Ascochyta

Spores produced on overwintered crop residues

Ascospores produced on residues can **impact fields miles away.**



Long-distance movement of *Ascochyta*

The experience from Washington and Idaho

Pre-1983: No *Ascochyta* blight known to occur in Washington or Idaho

1983: *Ascochyta* blight observed in chickpea variety trials in Pullman, WA

SOURCE:

Walter J. Kaiser

Plant pathologist (retired), USDA-ARS in Prosser, WA

Kaiser 1997. **Can. J. Plant Pathology** 19(2):214-224

Long-distance movement of *Ascochyta*

The experience from Washington and Idaho

1984: *Ascochyta* blight observed in 23 of 30 commercial chickpea production fields in northern Idaho

Pullman, WA



1987: Over 50% of the chickpea crop in Washington and Idaho severely impacted by *Ascochyta* blight

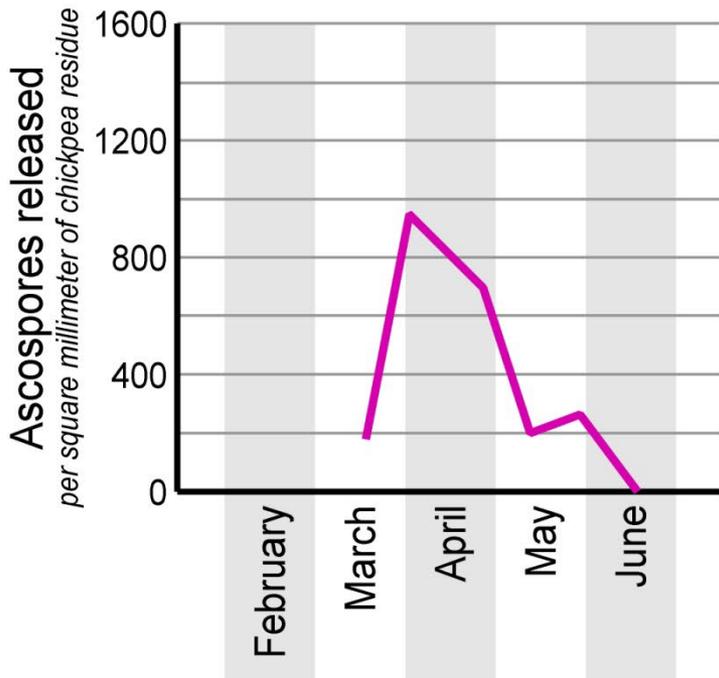
Long-distance movement of *Ascochyta*

Spores produced on overwintered crop residues

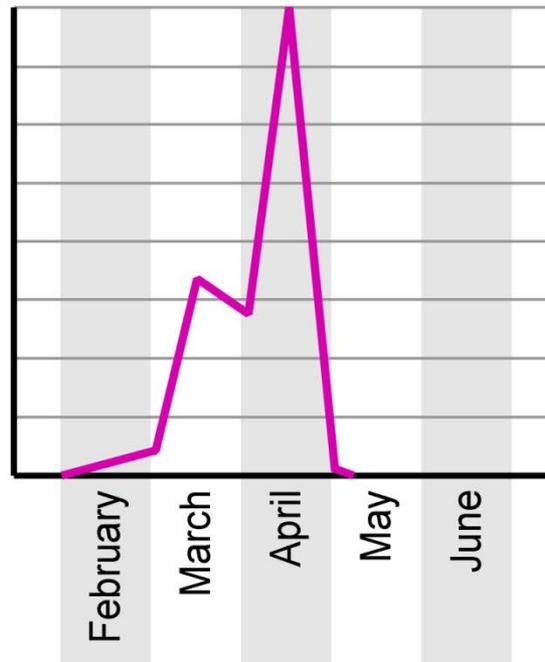
The release of ascospores from overwintered residues can be significant:

200-1,600 ascospores/mm² per day recorded in Pacific NW

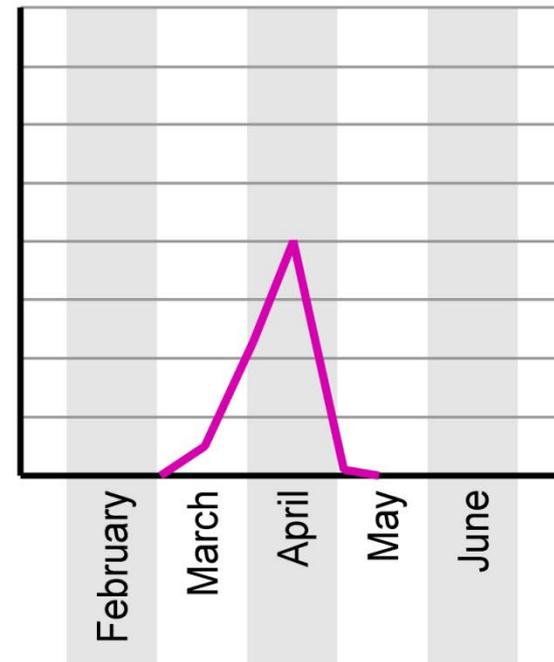
Genesee, ID
1985-1986



Genesee, ID
1986-1987



Pullman, WA
1986-1987



Implications for disease management

Spread of Ascochyta blight

The Ascochyta pathogen can move long distances.

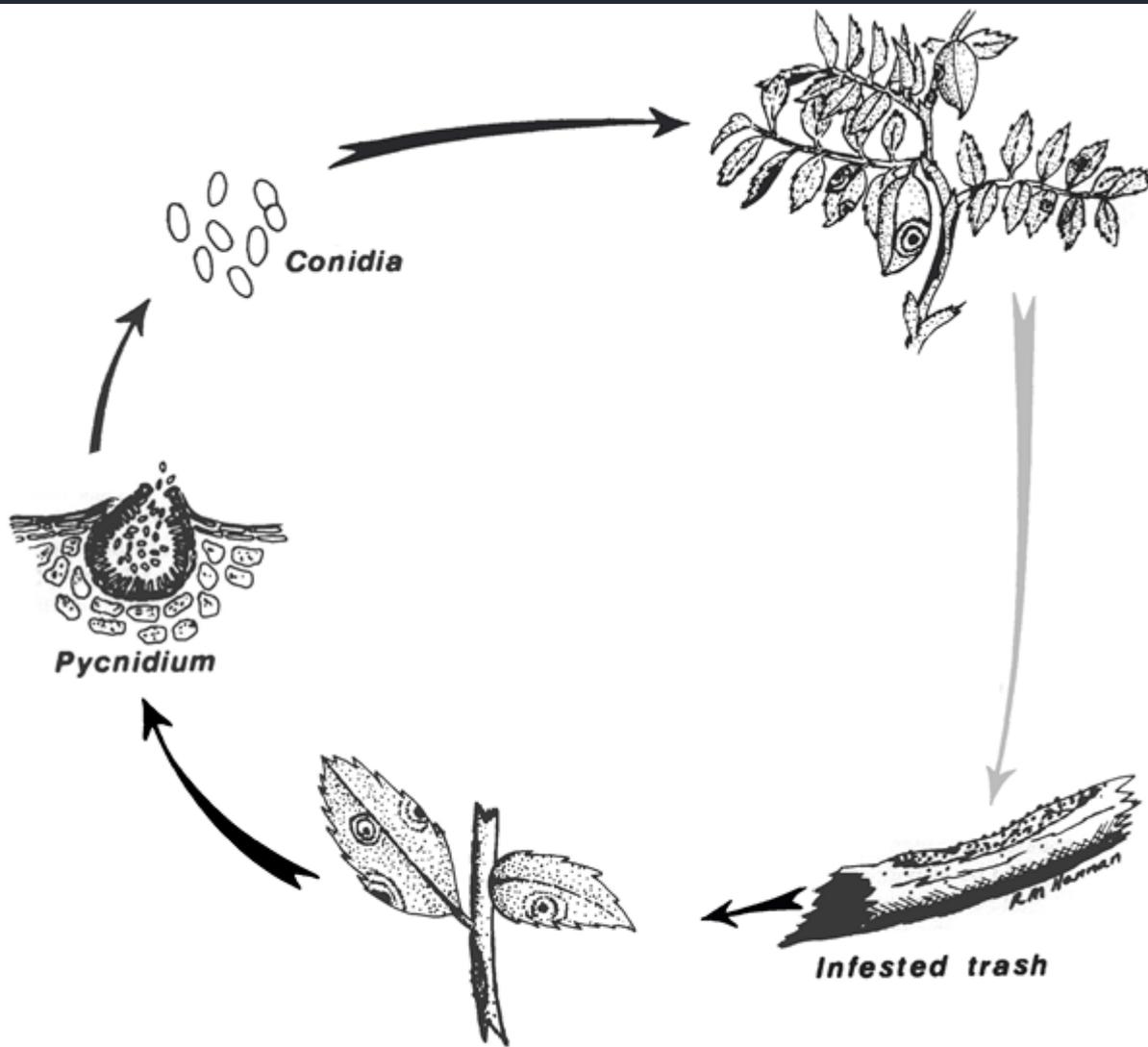
Even if you are growing chickpeas from 100% disease-free seed and you have no history of chickpea production, you are at risk of disease.

When fungicide resistance develops in one location, it can spread quickly.

Ascochyta blight is a community disease. An outbreak in one field affects everyone in the region.

Persistence of Ascochyta in the soil

Disease transmission from residues directly to a new crop



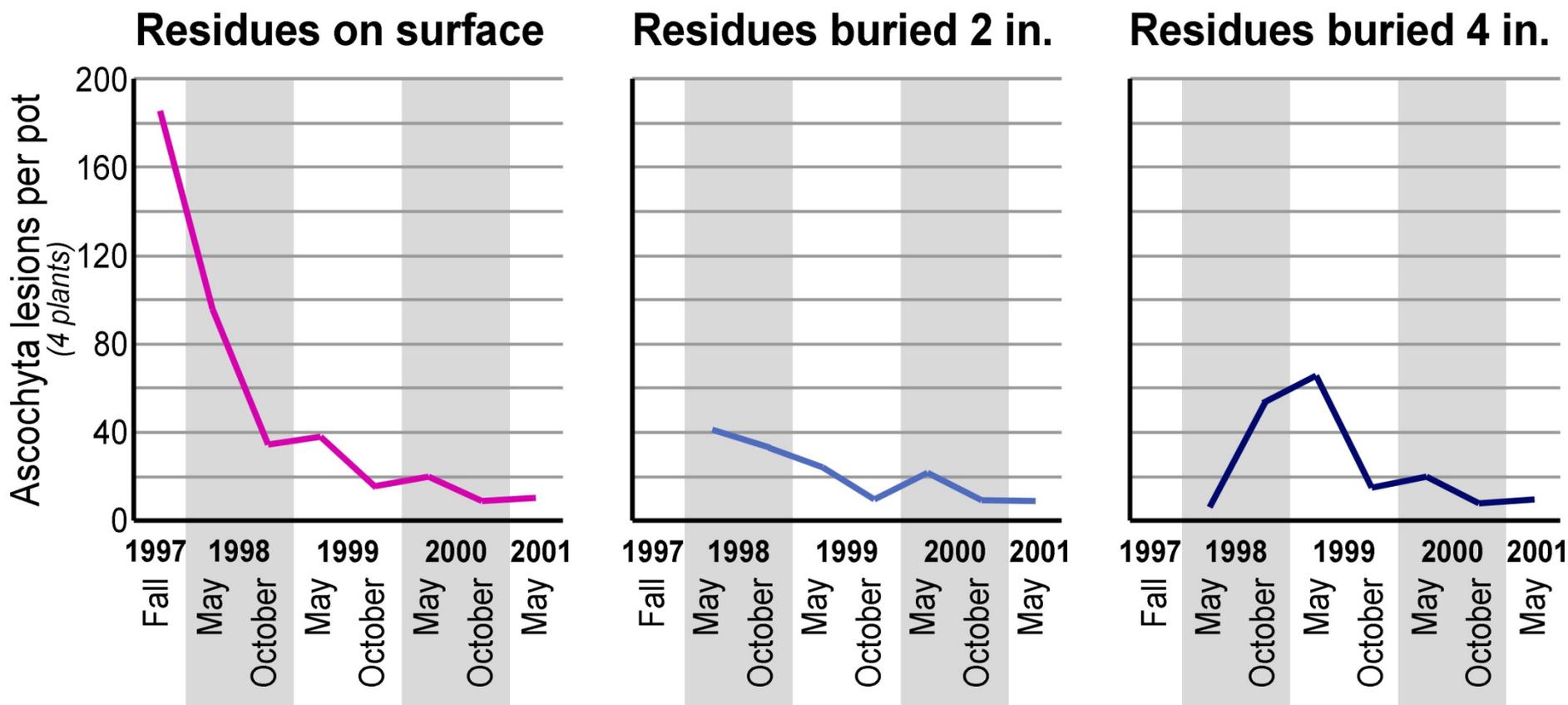
When crop rotation intervals are short, Ascochyta can be directly transmitted, infested residues to new crops

Transmission of Ascochyta blight from residues / infested soil

Disease transmission from Ascochyta-infected **chickpea residues** can occur for at least 4 years after harvest

Ascochyta-infected chickpea leaf residues

Saskatoon, Saskatchewan - heavy clay loam soil

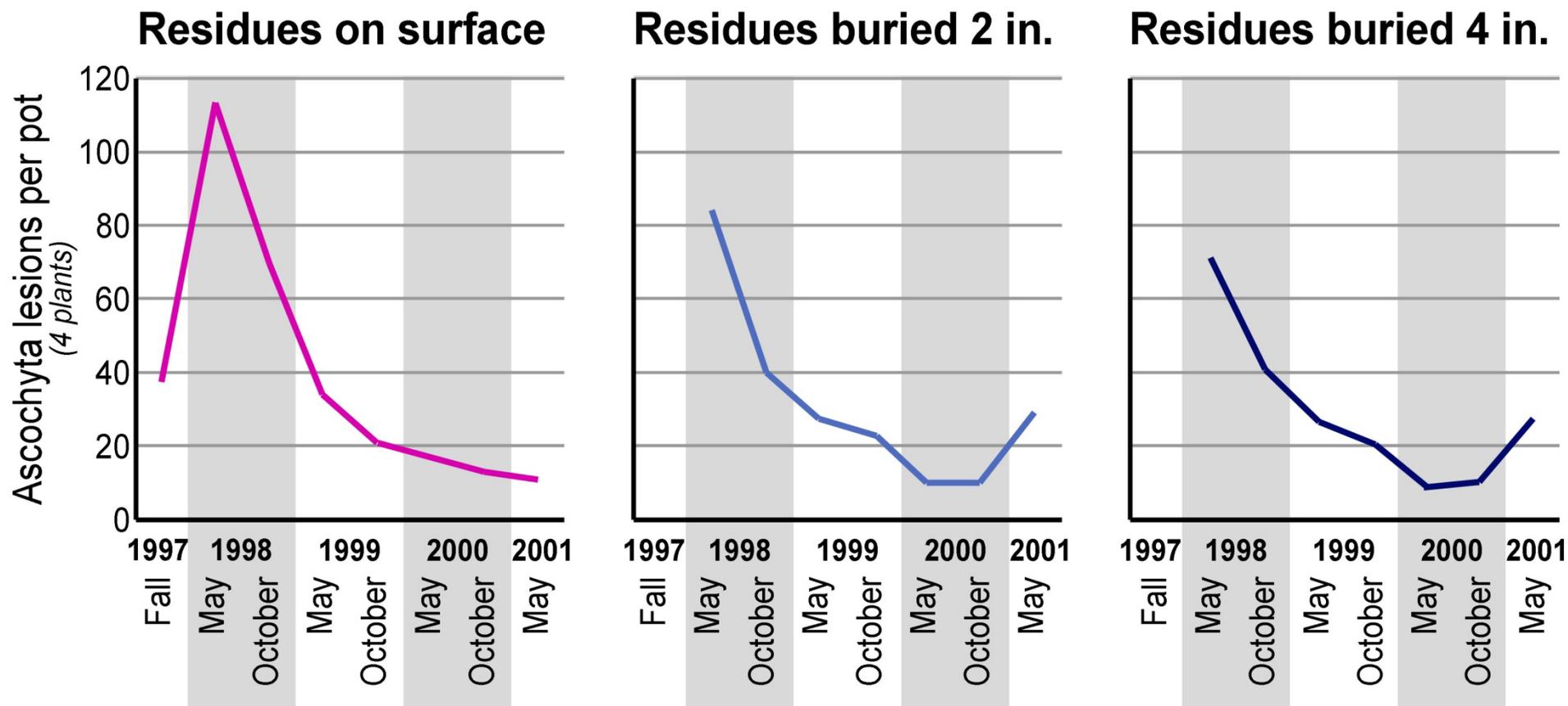


Transmission of Ascochyta blight from residues / infested soil

Disease transmission from Ascochyta-infected **chickpea residues** can occur for at least 4 years after harvest

Ascochyta-infected **chickpea stem residues**

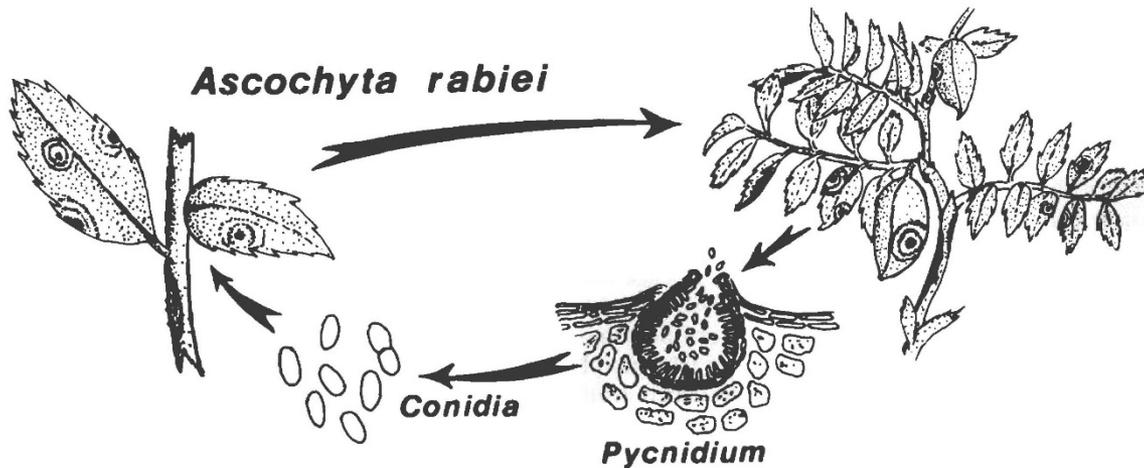
Saskatoon, Saskatchewan - *heavy clay loam soil*



Local, in-season movement of *Ascochyta*

Spores produced on diseased tissue

Spores produced on disease lesions **move short distances** via **splash dispersal, wind-driven rain**



Implications for disease management

Spread of Ascochyta blight

Once the disease is established in a field, it spreads only during rain events.

- When it is raining regularly, the first application should be made at the first appearance of disease symptoms or early bloom, whichever occurs first. Subsequent applications should be made 10-14 days apart.
- If there is no rainfall, applications can be delayed but must be made prior to the next rain event.

Ascochyta blight management in chickpeas

1. Clean seed and fungicide seed treatment
2. Crop rotation: minimum 3 or 4 years out of chickpeas
3. Appropriate selection of varieties
4. Applications of the most effective fungicides made preventatively before *Ascochyta* is observed above trace levels



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