

SANITATION TO MINIMIZE LATE BLIGHT

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Late blight is a devastating disease of potato and complete loss of a crop may result if it is not controlled. Potato foliage can be totally destroyed in the field and extensive tuber infection may subsequently result in complete tuber deterioration in storage.

Late blight can be managed with a combination of strict sanitation practices, timely fungicide applications that thoroughly covers the crop canopy, and proper irrigation management and cultural practices. Sanitation, the focus of this paper, is the reduction of inoculum that initiates epidemics and outbreaks. Sanitation is aimed at reducing potential sources of infection and includes the following:

1. Eliminate potato culls and refuse.
2. Avoid or destroy volunteer potatoes.
3. Use clean seed.
4. Do not plant seed lots with sprouted tubers.
5. Scout fields regularly for symptoms.
6. Manage disease in fields of ultra-susceptible cultivars such as Norkotah, Shepody and HiLite.
7. Manage late blight in home gardens.
8. Adequately hill tubers to reduce tuber infections.
9. Kill vines so that they are completely dead for at least 2 weeks before harvest.
10. Remove and destroy infected tubers prior to storage.

Disposing of potato culls and refuse has always been a problem for potato growers. Culls can be composted, macerated in wood chippers or snow blowers and left to freeze, or buried and covered with at least two feet of soil so that green shoots do not reach the soil surface. Culls in the fall can be spread on the ground and left to freeze during the winter. Frozen tubers will quickly decompose which will destroy any late blight fungus mycelium and sporangia in and on the tuber. If cull tubers are not completely destroyed before planting they should be composted, covered with a polythene tarp (mulch), burned, or buried. Culls coming out of storage in late winter or early spring are especially threatening sources of inoculum because infected tubers have been protected from low winter temperatures which aid in decomposition of tubers and the subsequent death of the fungus. If these culls develop late blight, the fungus is poised to move into susceptible, emerging volunteers and current season potato plants.

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Disease free seed is important in managing late blight. All infected tubers in an infected seed lot will not be evident on visual examination. Therefore, obtain seed from only fields where late blight has been completely controlled.

Proper handling and planting of potato seed is an important sanitation practice for late blight. Sprouted shoots on seed tubers before planting are extremely susceptible to infection by the late blight fungus. A very low percentage of infected seed tubers may produce a large number of sporangia and infect shoots of sprouted tubers if conditions are humid.

Fields should be scouted at least twice a week for late blight. Look for large black or purplish lesions on stems or leaves and white mildew (sporulation) on the under side of leaves. Check leaves and stems in the lower crop canopy as that is where the disease generally begins. Concentrate scouting in low-lying areas, in the center and along wheel tracks of circles and in areas that are protected from the wind where leaves tend to remain wet longer.

Sporangia (spores) of the late blight fungus that are formed on the foliage can be washed off foliage and through cracks in the soil by irrigation and rain water. Adequate hilling of tubers can help prevent this.

Strict sanitation practices will delay late blight outbreaks and will reduce dependence on fungicides. The following is a check list that can be used to remind growers when late blight management practices should be completed.

Late Blight Checklist

Year in Advance (August - September)

Determine level of late blight in seed fields. Buy seed only from fields where there was no late blight or where late blight was controlled and vines were completely killed for two weeks before harvest.

Winter - March

Know your enemy. Increase your knowledge about late blight and disease management. Access sources of late blight information such as the Potato Information Exchange telephone hotline (1-800-LBLIGHT), satellite systems (Grow Serve, Farm Dayta Service, ERF Weather Network) and the Internet.

Eliminate culls and potato refuse. The late blight fungus survives in living potato tissue. Kill the potato and kill the disease. Eliminate culls by:

- Freeze culls by spreading on open ground in winter.
- Bury tubers at least two feet or incinerate, when legal - not suitable for large amount of tubers due to leaching.
- Take to a compost facility - piling culls alone does not compost them.
- Cover with clear plastic to solarize in early spring.
- Feed livestock or take to feedlot. Be aware that giving culls away can still be a problem if the receiver does not manage the tubers for the disease.

Check seed lots. Know your seed source and the history of disease in the area where the seed was grown. Visually inspect seed. Confirm late blight in suspected seed.

Equipment maintenance. Fungicide application equipment should be maintained in good working order. If fungicide application is done by a custom applicator, schedule now and get assurances that a timely and adequate application will be done.

April - May

Warm and inspect seed before planting. Warm seed to 50°-55°F before cutting/planting. Cull any suspected diseased tubers. Record the lot from which suspect tubers came from and in what area you planted that lot.

Cut and plant seed tubers before sprouts emerge. Young sprouts are extremely susceptible to infection. Spores may spread from infected tubers during the handling and cutting operations to young sprouts.

Seed Treatments. Seed treatments do not control late blight. Plant seed in well-drained moist soil, with soil temperatures at 50°F and increasing.

Destroy all shavings from seed pieces. These could be sources of blight.

Do not mix seed lots. You could be mixing an infected lot with non-infected potatoes thus spreading your problem over your entire operation.

Do not plant shallow. This could lead to exposed or tubers near the surface which are more likely to become infected.

Identify cull piles in your area. Work with neighbors to eliminate culls and reduce volunteers. Your neighbor's culls and volunteers are your problem.

Keep informed on late blight status. Be aware of late blight forecast, weather forecast, local conditions, and University recommendations.

June

Form adequate hills. This will help reduce tuber infections.

No culls. Confirm that all cull piles have been destroyed.

Control for volunteer potatoes. Now is the time when inoculum is spreading from volunteers to your fields. Check previous year's potato fields for volunteers. Inspect stems for late blight. When possible, dig up, disk, or bury volunteers. Using an herbicide necessitates repeated applications.

Monitor fields regularly and early. Be sure to watch field areas that are low or naturally wet, with little air circulation, near the center of pivot, around wheel tracks that tend to hold moisture, or where water from two adjacent circles overlap.

Apply protectants early. Application of protectants before late blight exposure is essential for control. Apply when plants are 6" to 8" tall regardless of cultivar and continue at weekly intervals until mid July. If disease is confirmed in your area following row closure, use Chlorothalonil, Bravo, Terranil. Later applications would be based on late blight forecasts, weather, disease levels, and University recommendations.

The fungicide applications must be thorough. Good foliar application techniques are essential for late blight control. Make sure gallons per acre, sprayer pressure, etc. are adequate to penetrate potato canopy. Insure field is completely covered. Chemigation should be done with minimal water. If injection pump plugs or fails be certain to back pivot up to confirm coverage.

Keep informed on late blight status. Be aware of late blight forecast, weather forecast, local conditions, and University recommendations.

July - August

Monitor irrigation. Irrigation can increase conditions favoring late blight. When possible, do not irrigate during rainy weather. Decrease irrigation near the end of season as vines use less water. Know your crop's water needs and use good management practices.

Use good fertilization practices. Late nitrogen applications may increase time needed to kill vines and delay skin setting, therefore increasing the chance of late blight inoculum infecting the tubers during harvest.

Use recommended late blight protectants and schedules. Continue fungicide applications on a weekly basis or as suggested by University personnel. Their information will be based on weather conditions and disease pressure.

September

Vine kill canopy completely. Do not harvest until vines have been completely dead for two weeks. Watch for vine regrowth after vine kill, new green stems can be infected. If late blight has been present in field or in the area, apply a protectant containing Kocide or SuperTin during vine kill.

Don't harvest during wet weather.

Locate late blighted fields or areas in fields before harvest. Bypass areas with severe infection and either do not dig or dig later for direct processing, short storage, and/or early market.

Check for blighted tubers prior to storage. Diseased tubers from late blight and secondary infections such as soft rot obviously should not go into your storage. Though time consuming, inspecting tubers for disease will help determine storability and help storage and crop marketing strategies.

Use good storage management practices. Provide adequate air flow throughout the pile to prevent free moisture on tubers. Tubers that are at high risk for late blight should be stored at cooler temperatures (40°F) and be marketed as soon as possible. Use extra care in monitoring storage's for hot spots during late blight years. Reduce air humidity when possible, particularly right after harvest to eliminate any free moisture in pile.

Monitor storage's. Monitor on a weekly basis for problems. Rot problems in storage can be potentially detected by smell and/or warmer areas in the pile by infrared scanners.