

Biosecurity best practice for conservation

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Photo credit: Aline Finger (RBGE)

Carrying out plant conservation work (e.g., relocations, translocations, habitat creation, habitat restoration) carries a risk of the inadvertent introduction of pests and pathogens into sensitive habitats. Thereby negating the objectives of the work. For example, there are several species of *Phytophthora* (fungal-like plant pathogens) which are ideally suited to surviving and spreading within plant production facilities. If measures are not taken, pathogens can be introduced from the nursery or from soil on machinery/tools into the wider environment on plants during conservation activities.

Every phase of the process from the production of the plants, to planting at the restoration site, to movement of machinery and soil needs to be considered. The framework below describes actions that could be taken to reduce the risks of, and increase resilience to, plant pests without identification of specific plant pests.

Key principles to promote plant health in the natural environment:

1. **Risk assessment** – a thorough assessment should be made before an activity is carried out to identify and assess the potential impacts and risks of that activity. The boxes below can be used to help develop the risk assessment.
2. **Bio-security protocols:** should be developed to mitigate or reduce the risks identified in the risk assessment.
3. **Responsible person for biosecurity:** Organisations involved in habitat creation/restoration should have a named individual responsible for biosecurity. This person should be trained in biosecurity and have overall responsibility for the development of a risk assessment and protocols that address biosecurity risk.
4. **Check protocols followed:** Regular checks should be made by the responsible person throughout the project to ensure biosecurity protocols are followed by staff and contractors.
5. **Monitoring:** Assessing plant health should be part of regular monitoring, such as habitat condition surveys or the monitoring of restoration/creation success.



Photo credit: Scot Ramsey (Hutton)

The risks associated with the movement of plants and soils:

Risk factor	Lower risk	Higher risk	Risk reduction measures
Stage of plant life cycle	Seed	Adult	Use seed/spores for conservation programs, plants as a last resort. Bare-root plants are potentially lower risk depending on their production regime. Establish the biosecurity credentials of suppliers of both plants and seeds (e.g., are they Plant Healthy Certified?).
Soil movement	No	Yes	Avoid moving soil or growing media between sites unless it has been heat treated for a period that would kill all pests and pathogens.
Distance from source to nursery	Local, short distance	Long distance	Collect material for propagation locally where possible.
Distance from nursery to release site	Local, short distance	Long distance	Consider setting up a nursery near to the site where biosecurity can be controlled by the project team.
Number of plants	A few individuals	Lots	Ideally seed should be used for conservation programs. If plants are required, consider setting up a nursery near to the site where biosecurity can be controlled by the project team.
Plants held in propagation facilities that also grow a wide range of other plants, often from many sources	No	Yes	Plants sourced externally to the project should be subjected to a period of quarantine at a dedicated nursery away from other plants (at least 3 months). They should be monitored continually for signs of pests and diseases. They should only be released for planting into the wild once they can be confidently described as free from pests and pathogens.
Plants held in propagation facilities with good biosecurity practices	Yes	No	See section below 'Reducing risk to wild ecosystems during nursery production of plants'.
Species susceptible to pests or pathogens which lead to high rates of mortality and/or damage	No	Yes	Species selection based on plant health considerations should be made during the planning phase of a project, such as consulting the UKPHRR or host lists of known pests. The person responsible for biosecurity should ensure all staff are aware of the associated plant health issues relating to the plant species they are working with.
Species susceptible to pests or pathogens which also impact on a broad range of host species	No	Yes	Species selection based on plant health considerations should be made during the planning phase of a project. The person responsible for biosecurity should ensure all staff are aware of the associated plant health issues relating to the plant species they are working with.

The risks associated with the movement of machinery and equipment used for managing the site:

Risk factor	Lower risk	Higher risk	Risk reduction measures
Proximity of site to roads / tracks	Close	Long distance	All staff made aware of biosecurity guidance. All machinery sanitised thoroughly before it arrives on site. Careful consideration required during planning stages of the project regarding site selection. Where possible avoid movement of machinery over large areas of previously undisturbed ground.
Movement of equipment across large areas of land, often crossing ownership boundaries	No	Yes	All staff made aware of biosecurity guidance. All machinery sanitised thoroughly before it arrives on site and also when it is moved between sites.
Local contractors / machinery	Yes	No	Training of contractors / staff prior to project commencement to ensure that all machinery is sanitised thoroughly before it arrives on site and that all guidance is followed.

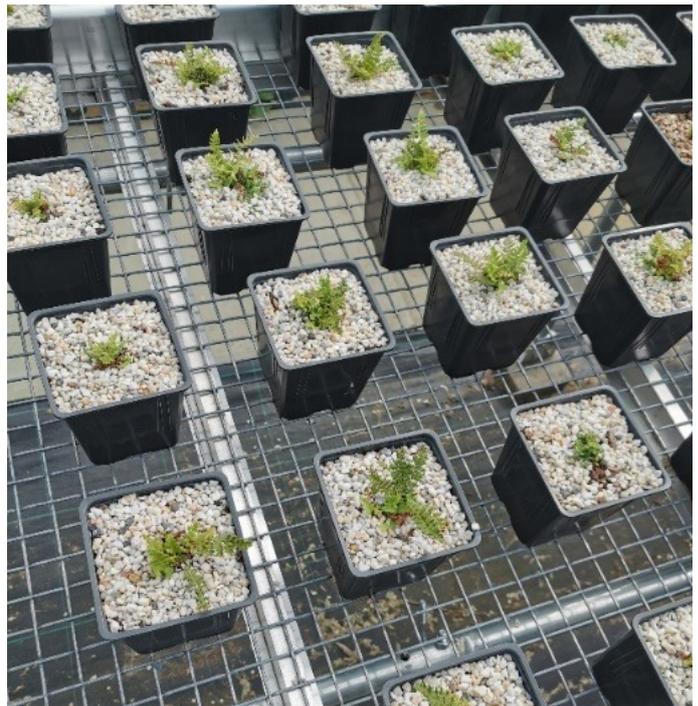
Ongoing biosecurity risks associated with site management:

Risk factor	Lower risk	Higher risk	Risk reduction measures
Site or contractors entering the site on foot	No	Yes	The “Arrive Clean – Leave Clean” philosophy should be adopted. Staff should get in the habit of arriving on site with cleaned footwear and cleaning footwear as they leave the site. [Link to Keep it Clean]
Hand tools brought onto site (e.g., spades for planting activities).	No	Yes	All equipment should be sanitised prior to it being used on site.
Recreational visitors to the site.	No	Yes	Provide interpretation to encourage visitors to “Arrive Clean – Leave Clean”.

Best biosecurity practice for nursery production of plants

Sites used for plant production should be clearly defined with limited access for critical staff only. Producing plants under cover (e.g., a poly tunnel) can help create a secure environment. Particular attention needs to be given to:

- Site access should be restricted to critical staff only who have been trained in biosecurity. Disinfecting foot baths/mats should be placed at the site entrance(s).
- Pots – use new or sterilised pots. Store pots off the ground in clean racks or covered bins.
- Growing media – use a growing media that has been subjected to a recognised heat treatment standard (e.g., PAS100). Store in sealed bins or bags off the ground.
- Water and irrigation – use municipal water or a deep well. Ensure good drainage across the site to ensure there is no standing water (e.g., puddles). minimize splash between containers (e.g., by using drip irrigation).
- Workflow and layout – separation between workflows can minimise disease spread. For example, maintain maximum separation between clean growing areas and plant waste.
- Propagation and growing areas should be kept separate and scrupulously clean. Never place pots on bare soil. Clean up leafy debris which may contain pathogens.



- Phytosanitary practices – Disinfecting foot baths should be placed at all entrances. Keep work areas and tools clean using disinfectants. Any vehicles that come onto site should have their wheels cleaned.
- Plant waste management – use best practice guidance ([PHC2021/02 guidance](#)) to ensure that waste is managed effectively to avoid the build-up of pests and disease on site.
- Monitor plants regularly and recognise a diseased plant so that issues can be managed at an early stage ([FR factsheet](#)).
- Know who to report any diseased plants to and what action should be taken (HMU at SASA (Scotland), APHA (England & Wales), DAERA (NI) for non-woody plants, Tree Alert (Forest Research) for trees).
- If any commercial plants are being brought onto site, ensure the nursery where the plants are sourced follow best management practices for disease prevention (e.g., the Plant Health Management Standard).
- Further information and guidance can be found in the Plant Health and Natural Environment Fellowship [report and policy summary](#) on the Plant Health Centre website.