

Chilean needle grass rust - *Uromyces pencanus*

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Site selection

1. Chilean needle grass plants should be well established and healthy.
2. If available, sites should be protected from drying out, sheltered or shaded from eastern sun, so that moisture present is retained longer.
3. If possible, the leaves should be wet from dew, fog or rainfall. The rust spores need a wet leaf surface for a minimum of 8 hours (usually 8-12 hours) to germinate.
4. Sites should be left undisturbed with no grazing or spraying of herbicides.
5. Sites should be as safe as possible from frost, fire and flood.
6. If possible, the release site should be part of, or close to, a large infestation of Chilean needle grass to allow for spread and development of a rust epidemic. However, this is not vital as it is important to get the rust established first.
7. The site location should be tagged and recorded by GPS as well as a street address with a reference to a well-known position, e.g. a bridge, creek or road junction. This is important for future reference when someone unfamiliar with the area may be required to inspect the site.

Transport and Storage

The dry powdery spores are sent in plastic vials. If possible, releases should be made within 1-2 days of receipt, and vials should be stored in the refrigerator (not freezer) until needed. However, if releases cannot be conducted immediately, vials should be stored in the freezer where they will last up to 1 months.

While traveling to the release site, vials should be kept cool (around 4°C, if possible). A chilly bin with a cold pack is ideal. **Vials should not be left in a car in the sun.**

Rust spores are living organisms, and their viability decreases over time.

Release Procedure

1. Spores are pre-mixed with talcum powder at the rate of 1 part spores to 30 parts talc. With a paintbrush, brush the mixture on the top side of a leaf (recognizable by the ridged leaf veins). Select 5 to 10 well-developed, healthy leaves per plant, applying the mixture primarily to the broadest part of the leaf blade with one paint brush every one centimetre along the leaf blade. Take care not to overdose each leaf as this may cause the leaf to die before pustule development.
2. After inoculation, spray the leaves generously with a mister.
3. If no rain is forecast, consider placing a plastic bag over each inoculated plant, pinning it to the ground to prevent it from blowing away. This will create a moist environment favourable for spore germination. The bag should be removed the following morning to prevent it from heating up in the sun. Transparent or white bags are preferable to black bags for this reason.
4. Cinnamon-brown pustules will develop on the top side of the leaves within 4 to 5 weeks.

Commonly Asked Questions

o Is the rust likely to affect other plants?

It is extremely unlikely that the rust will affect anything but Chilean needle grass. Before this rust was released, it went through a stringent process to test the likelihood of it going onto other species. It was thoroughly tested on plant species related to Chilean needle grass and grasses of economic importance. It has been shown to be specific to Chilean needle grass. In fact, the rust strain released in New Zealand, is only capable of infecting two of the three populations present in New Zealand, i.e. the Marlborough and Canterbury populations are susceptible whereas the Hawkes Bay populations are resistant.

o Will Chilean needle grass be eradicated by the rust?

No. Over time, Chilean needle grass may be reduced to a level where it is no longer problematic or sufficiently suppressed to be controlled by other techniques. The biological control agents (rust) need the weed as a food source. As the weed becomes dense, the rust thrives; when the weed declines, the numbers of rust infections also decrease. Thus, a natural balance will eventually be reached. Complete eradication is not possible.

o When should I put out the rust?

The rust relies on moisture to begin its growth cycle. Ideal conditions include light rain overnight. However, dew, mist, or spray can also provide enough moisture to start the growth cycle. The best time for release is late afternoon in autumn or spring.

o How long will the rust keep?

The rust loses viability over time. Suggested guidelines are:

Room temperature 3-4 days

Fridge temperature: up to 2 months, though with increasing loss of viability

Freezer temperature: up to 6 months

o Does it matter if the rust is posted at room temperature and then frozen?

No. But the rust will have begun to lose viability. Ideally, the rust should be applied within 1-2 days of receipt.

o How often should I put out the rust?

A suggested approach is to check the release site after six months (the following spring or autumn) to see if the rust has established. If it has not, consider reapplying the rust.

o Can I improve the rust's effectiveness by bagging plants or spraying the rust onto the leaves?

After each inoculation with dry spores, spray the plants with water. If rain is not forecasted, bagging the plant overnight (pinning the bag to the ground to prevent it from blowing away) will help maintain a moist environment. Be sure to remove the bag the following morning.

Rust spores can also be applied by spraying them onto the leaves in a water solution. If you prefer this method, ask for spores without the addition of talcum. Mix the spores with water and add 1 or 2 drops of Tween 20 (or another surfactant). Spray bottles should be constantly moved to prevent spores from settling.

o Will the rust survive through winter or drought?

The rust can survive in living plants during winter and droughts. In its native range in Argentina, it is well established in regions with extensive droughts and moderately cold winters. However, it is believed that the more resistant resting spores (teliospores) of the rust lost their ability to germinate. Occasionally, it was found to go locally extinct in its native range.

o **How much rust should I apply to a plant, and how wide an area should I cover?**

A whole vial should be used for a single release site. Ideally the rust should only be spread over about 1 m². By spreading it too far, identifying rust pustules on leaves spread over a wide area will be difficult. Do not overdose the leaf for too much rust may cause premature leaf drop.

o **Where on the plant should I apply the rust?**

It is important to apply the rust to the top side of the leaves, which can be identified by the ridged leaf veins. Focus on applying the rust to long, healthy leaves, especially where the leaf blade is broadest.

o **How will the rust be delivered in the mail?**

The rust spores will arrive in a packet pre-mixed with talc in a sealed vial.

o **What should I look for to confirm that the rust has established?**

Look for rust pustules on the upper side of the leaves. The pustules are powdery cinnamon-brown dots, typically located between the prominent veins. You may also notice yellowing around the pustule on both sides of the leaf. Often the rust pustules may only be seen upon close inspection and can be easily confounded with other types of leaf spots often present in the field. Using a hand lens may help with the identification.



Topside of leaves with rust pustules