# Bonsai Pests: Plants

Why we care

* Large-leaved weeds can make bonsai look proportionally smaller.
* Weed roots can be hard to distinguish from the bonsai’s own root ball, making root pruning difficult.
* Weeds can absorb nutrients meant for the bonsai.

## Treatment

* Pick out with small pair of tweezers – e.g. beautician’s tweezers from high-street pharmacist.
* Where possible try to get the weed’s roots too, ideally without disturbing the surrounding moss or the tree’s root ball.

## Common plant pests

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| Common name | Latin name | Appearance |
| Pearlwort / Irish Moss | Sagina | Looks like very small tufts of grass, occasionally with small flowers  Not actually a moss! |
| Liverwort | Marchantiophyta | Flat green fungus-like pads forming along the ground  Related to moss (no roots!)… but much uglier  Can be a sign of over-watering |
| Wood sorrel | Oxalis | A clover-like three-leaf arrangement, but with more heart-shaped leaves |
| Navelwort / Pennywort | Umbilicus rupestris | Flat green circular fleshy cap on a pale stem |
| Grass | Various – e.g. Lolium perenne | As per the average lawn |
| Witch’s Jelly | Nostoc | Green snot-like blobs – the Latin name derives from “nostril”  A sign of major over-watering  Technically a bacterial colony not a plant |

## Non-pest plants

* Mosses have “rhizomes” rather than roots: they don’t grow down into the soil, only up towards the light. This makes them a lot easier to scrape off when it’s time to root-prune!
* Some shallow-rooting succulents (e.g. sedum / stonecrop) can grow in a bonsai pot without interfering with the tree’s root ball. Not recommended for display-ready bonsai, but a good opportunity for succulent propagation!

# Bonsai Pests: Pathogens

Why we care:

* Plant diseases can kill a tree even if it is otherwise treated perfectly. They can ravage large populations at the same time and, unlike with diseases of humans, most have no known treatment.

## Treatment

* Isolate the diseased tree immediately, especially from any closely-related trees.
* Treatment – if any is possible – will depend on the pathogen, e.g. fungicides for fungal diseases.
* For soil-based pathogens, changing soil may help. Do not re-use the diseased soil, and dispose of it carefully!

## Selected current and historical diseases

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| Common name | Latin name | History |
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## Non-pest “infections”

* Many trees, particularly conifers, can develop threads of white fungus on their roots. These mycorrhizal (symbiotic) fungi are beneficial for the plant: they can help it recover faster from stresses.
* White fuzzy mould often forms on the surface of soils rich in organic components (e.g. tree bark). This is a bit unsightly but generally harmless – no treatment required unless you’re preparing for a bonsai show.
* Small mushrooms may appear – these are just the “fruit” of the mycorrhizal fungi and mould, and are no more harmful than them.

# Bonsai Pests: Animals

Why we care

* Insects, mites and other invertebrates can damage a tree’s ability to survive by eating its leaves or roots.
* Some pests suck the tree’s sap, which – in addition to draining its vitality – can act as a vector for disease.
* Some pests form webbing which can trap dead foliage, block light, and generally look ugly.

## Treatment

* Spray with an appropriate insecticide, and keep an eye open for reinfestation.
* For spider mites: make sure to brush off any webbing, as mites can (a) hide from the insecticide in it and (b) use it to reinfect the plant faster later. Subsequent (non-insecticidal) misting of leaves can slow reinfection and highlight any left-over or new webbing.
* Some infestations are treatable by phages, e.g. nematodes that predate wine weevils. However, these tend to be very specific – one nematode species per pest – so not recommended for beginner bonsai practitioners.

## Common animal pests

|  |  |  |
| --- | --- | --- |
| Common name | Latin name | Appearance |
| Spider mite | Tetranychida | Tiny – sub-millimetre – white flecks. Not actually spiders; they’re called this because they use webbing to move between branches, which is often the first sign of their presence. Sucks sap from leaves, which kills them: look for pinprick-sized spots.  Dislikes water – e.g. rain – so most dangerous for indoor plants and plants growing under cover. Endemic in UK homes. |
| Aphid | Aphidoidea | Black, green or white flecks, 1-2 millimetres in length. These especially like to congregate on new shoots and suck out the sugary sap. |
| Leaf miner | Various | Digs through leaves – look for white lines. |
| Vine weevil larva | Otiorhynchus sulcatus | Half-centimetre white grubs, as imagined by H. R. Geiger. These live underground and will eat the cambium off roots. Especially devastating for plants in pots – like bonsai! – and for yew trees, which are sensitive to root loss. |
| Cranefly larva aka leatherjacket | Tipuloidea | Often found in moss taken from gardens and roofs. Can damage tree roots and inhibit growth. When metamorphosing, they leave behind empty tubes that look like they’re from the Alien franchise. |
| Slug / snail | Gastropoda | These can eat leaves in large numbers very quickly, and produce unattractive silvery slime.  Eggs can be easily mistaken for slow-release fertiliser balls – both ~2mm spheres – but are stickier and typically appear in clusters. |
| Caterpillar | Lepidoptera | These have become more of a problem in London in recent years. Large groups can skeletonise a tree in short order. Some species (e.g. oak processionary moth - Thaumetopoea processionea) are toxic. |
| Rat | Rattus norvegicus | Not a problem for the bonsai itself, but can go after blood-and-bone fertilisers that haven’t been properly fermented. |

## Non-pest animals

* Detritivores like earthworms, woodlice and springtails are generally beneficial. In breaking down dead-wood and other organic components of soil, they provide a source of fertilisation to the plant. Worms also help aerate organic soils.
* Predators like centipedes, spiders and ladybirds can help reduce the impact of harmful infestations. However, spider webs can cause build-ups of detritus which provide hiding places for harmful pests.
* Nematodes – typically appearing as thin white worm-like threads – may be harmful or beneficial, depending on species. Keep an eye on your tree’s health if you see them in the soil.
* Birds are very good at picking off any beetles, snails and slugs that find their way onto your trees.

## Pesticides: environmental considerations

* Ideally we wouldn’t need to use insecticides, since these (a) can also kill beneficial insects and (b) are often produced by industrial processes with a high environmental footprint.
* However, organic pest control methods are frequently reliant on a tree being part of a rich ecosystem, which is explicitly *not* the case for mature bonsai. Others such as mulching can introduce too much excess nutrition for a mature bonsai, although they may be feasible for bonsai in training.
* As a middle ground, we can use mechanical methods where possible, for example picking out grubs by hand or washing aphids off leaves and branches in the shower. (Set to “warm”, to reduce surface tension.) However, this is not always feasible for e.g. spider mites on Chinese elm, where the leaves will tend to come off too.
* “Specific” insecticides are generally preferable, since they are less likely to affect other animals in the food chain. However, commercial household insecticides are often *too* specific: e.g they don’t always affect spider mites.
* Thanks to environmental regulation, most modern household insecticides will break down over time, preventing build-up in the ecosystem. However, it’s good to check the constituents to confirm this. Notably, some approved substances for organic agriculture (e.g. copper compounds) do build up if overused.
* Neem oil is a “broad-spectrum” natural insecticide with no effect on mammals or birds at typical concentrations. (Something like: 5ml neem, 5ml washing-up liquid, 1000ml warm water.) Its active component, azadirachtin, is a permitted substance for organic farming in the EU. It is toxic to a range of pest insects on direct contact and repulsive at a distance, but harmless to some (not all) beneficial insects. It degrades quickly once applied, so doesn’t build up in soil; this does mean that regular spraying (e.g. every quarter) may be needed to prevent reinfection.
* When applying *any* insecticide, be aware of the amount used and be careful where you’re spraying. If pots are on lawns or near flowerbeds, move them onto the patio first. If possible, avoid spraying during a tree’s flowering season when it may attract insects to itself. If parts of the plant have been colonised by helpful bugs – e.g. centipedes in the moss layer – you may wish to only spray the remaining areas. Don’t spray into standing or running water.
* Some organic methods can be adapted for bonsai use. For example, companion planting of a more vulnerable species – e.g. a cheap supermarket miniature rose – as a “trap crop” can provide advance warning of infestation, but is unlikely to prevent it.