Canada Bonsai

WINTER CARE – OVERWINTERING BONSAI IN CANADA

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Purpose

There are many ways to protect your bonsai during winter in Canada. This topic can be very simple, or very complex. The following guidelines are based on two core principles:

- Cost efficiency
- <u>One solution</u> that suits almost all of the classic and common species used for bonsai

Yes, it is true that some species (e.g. larch) do not *need* much protection to survive, but those same species also thrive when overwintered in a cold frame.

Rather than trying to provide 2 or 3 different overwintering shelters, Canada Bonsai proposes <u>one solution that suits all of trees listed below</u> (list is not exhaustive).

The suggested temperature range (+2C to +5C) maintained in a cold frame is not just sufficient, for many reasons it is ideal and therefore used around the world.

Deciduous	Conifers	Fruiting and Flowering
Japanese Maple	Japanese Black Pine	Satsuki Azalea
Trident Maple	Japanese White Pine	Ume (Japanese Apricot)
Hornbeam	Japanese Red Pine	Cherry
Birch	Pitch Pine	Japanese Quince
Beech	Jack Pine	Crabapple
Chinese Elm	Scots Pine	Bittersweet
Zelkova	Eastern White Pine	Beautyberry
Stewartia	Shimpaku Juniper	Winterberry
Ginkgo	Japanese Garden Juniper	Persimmon
Hackberry	Larch	Pomegranate
Chinese Quince	Cypress	Magnolia
Oak	Spruce	Hawthorn
etc.	Cedrus	Pyracantha
	Eastern White Cedar (Thuja)	Styrax
	Redwood	Wisteria
	Yew	Cotoneaster

Design

Below are 2 designs that have worked for us (larger pictures are at the end of the document). The same key ideas apply whether you build this on the ground, a roof, or a balcony.

In addition to protecting your trees, two major benefits of using an outdoor cold frame are the ability to get an early start in spring, and the elimination of the need to repeatedly move trees in-and-out in spring to avoid late frosts.

A cold frame will also keep rodents away from your trees if properly sealed.

The BASIC REQUIREMENTS will cost under $200 for an 8'x8'x8' cube
- wood frame (2"x4"x8')
- 1 layer of 6 or 7mm polyethylene
- space heater (1500W is more than enough)

- Add $90 if you choose to add plywood sheets over the polyethylene (discussed below)
- Add $80 if you choose to add insulation boards
- Or add $25 if you choose to use an inflated double-layer of polyethylene + $10 for a fan

An alternative option is a 'greenhouse kit':
- higher initial cost
- potentially greater life expectancy
- cleaner appearance
- automatic mechanical vent

Cost of Operation

Basic cost of operation will be around $75-150 per year for an 8'x8'x8' cube. Here is the formula for calculating your electrical cost:

Daily Consumption: (wattage x hours used per day) / 1000
Annual Consumption: Daily Consumption x Number of days used per year
Cost: Annual Consumption x your region's kWh usage.

The average cost of electricity in Canada in 2020: 14.5¢/kWh = $0.145/kWh

If you were to run the space heater 24 hours per day, 7 days a week, for 4 months, the maximum possible cost would be $626.40, but nobody will run their heater 24/7.

(1500w heater x 24hrs) / 1000 = 36
36 x 120 days (= 4 months) = 4320
4320 x $0.145kWh = $626.40 (significant exaggeration)

True cost
In 2019 my heater turned on for 2-3 minutes every 15 minutes (= 288 minutes per day = 4.8 hours per day) during our two coldest months in Montreal (Jan-February). It ran less often in December and March. I will anyways use 4 full months in this calculation, so that we are still overestimating (rather than underestimating!) our operational cost:

(1500w heater x 4.8hrs) / 1000 = 7.2
7.2 x 120 days (= 4 months) = 864
864 x $0.145 = **$125.28 (for the full winter)**

TIPS to save on electricity:
- Prevent drafts
- Add insulation boards and plywood to your walls and roof
- Build your cold frame over a stairwell or against a house or shed
- Use the sun to your advantage

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The Process

Fall

1. After your trees experience a few light frosts, move them into your cold frame. Maintain a temperature between +2C and +5C all winter.

2. Once all of your deciduous trees have lost their leaves, if you are not using an inflated double-layer of polyethylene, you can apply insulation board and/or plywood to the exterior of your structure. This is not necessary, but here are the Pros and Cons of insulation board and plywood:

Pros	Cons
They will lower your heating cost	…but they themselves have a cost
They are easy to remove in spring	…but snow must be cleared from them so that spring removal is possible
They block sunlight and prevent overheating	… no con! Keeping your trees in darkness all winter has been a successful practice for decades with many species in cold regions
They offer some 'control' over when spring starts for your trees	…you will be tempted to get an early start! (We personally start in March)

Winter

3. Maintain a temperature between +2C and +5C all winter. Water as needed.

Spring

4. If you added insulation boards and plywood, remove them to start letting the light in.

5. To prevent overheating, on warm or sunny days you will need to open your cold frame during the day, and then close it at night (see discussion of Fans, below).

6. When there is no longer any risk of late frost in your area, move your trees outdoors (acclimate them gradually).

Late Spring & Summer

7. Consider using your cold frame as an excellent high-humidity propagation room with the use of a simple misting system.

Optional Features

THERMOSTAT (approx. $100)
If your space heater does not have a built-in thermostat, an external thermostat is crucial.

We use the Bayite 15A Thermostat (do not get the 10A model, because most space heaters draw more than 10amps).

This thermostat allows you to set a maximum temperature and a minimum temperature. When the temperature drops below your range, the heater turns on. When the temperature climbs above your range, the exhaust fan turns on (see discussion of Fans, below).

https://www.amazon.ca/bayite-Temperature-Controller-Thermostat-Pre-Wired/dp/B01KMA6EAM/ref=sr_1_2?dchild=1&keywords=bayite+thermostat+15a&qid=1602101683&sr=8-2

FANS (approx. $200)

On a sunny day, there is a risk that the sun will overheat your cold frame. Insulation and plywood will prevent this during the winter, but not in spring when you want to start letting light into your cold frame. Don't underestimate the sun! On a sunny day, even if it is only +5C outside your cold frame can easily climb to +40C, which would negatively affect your trees.

There are two solutions to prevent overheating, and we use a combination of the two!
- You can start opening 1-2 sides of your cold frame during the day and closing it at night.
- You can add intake and exhaust fans

We use two 12" iLiving fans: one for air intake, and one for exhaust. They are both plugged into the 'cooling' outlet of aforementioned thermostat.
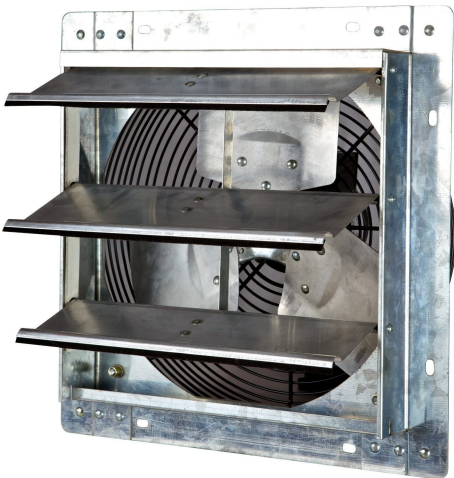
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HEATER

Any 120V space heater should to the trick. 1500W is plenty for an 8'x8'x8' cube! Make sure that your space heater is under 15A (that's the limit of your thermostat!). Here is one that we have had success with:
https://www.canadiantire.ca/en/pdp/mastercraft-ceramic-barrel-heater-0436145p.html#srp

A propane heater can be a valuable back-up during power outages. We use a Mr. Heater:
https://www.canadiantire.ca/en/pdp/mr-heater-9000-btu-buddy-portable-heater-0762357p.html#srp