

## Box Hibernation Method

Hibernation of a tortoise in an insulated box, in a frost-free environment during the winter is the traditional method used by tortoise keepers for their hibernation species. Although the warmer winters of recent years, in cooler countries such as the UK, has meant that many keepers now opt for refrigerator hibernation, other keepers still prefer the box method, and we have attempted to provide a comprehensive guide to the box method in this document. The box method can provide an excellent environment for hibernation, but like the fridge method it requires advance planning and precautions should be taken.

### Equipment

#### Two boxes:

The inner box should be made of plywood or cardboard. It should be large enough for the tortoise to turn around in, but small enough to sit inside the outer box with a 2"-3" gap all the way around.

The outer box should preferably be made of polystyrene.

#### Substrate:

Shredded paper or a 50/50 sand/soil mix is recommended. The preferable, denser sand/soil mix offers additional protection, a more natural hibernation environment and will aid in keeping the tortoise at a stable temperature. It is, however, messier when checking the tortoise.

#### Insulation material:

Use shredded paper, polystyrene packing etc. for insulation between the inner and outer box.

#### Thermometers & Alarms:



A good quality, accurate, in/out, max/min digital thermometer is absolutely essential for checking temperatures during hibernation. These can be purchased with an audible alarm. A good thermometer and alarm may well save a tortoise's life. A spare thermometer is advisable in case the one in use fails.

A useful way to test the accuracy of a thermometer is to fill a glass with ice cubes and water, and wait five minutes. Then put the probe of the thermometer into the ice water and wait several more minutes. It should read 0°C (32°F). If it reads more or less than this temperature, you can still use the thermometer but adjust the reading accordingly.

#### Location:

There are a number of factors to consider when you are choosing a place to hibernate your tortoise. The most important things are:

#### Temperature:

Hibernation is much more than just a deep sleep; it is a biological state when many complex changes occur within the tortoise. The ideal range of temperature for

successful hibernation is between about 3°C and 7°C (37°F and 45°F). A tortoise must **NEVER** be exposed to freezing temperatures or frost. At temperatures of 2°C (36°F), the eye tissue may become damaged and could result in loss of sight; any lower than that, and there is the risk of brain damage or even death. At around 8°C (46°F) many tortoises will begin to stir, using vital reserves, and at temperatures over 10°C (50°F), the tortoise will no longer be in a hibernation state.

At 10°C (50°F), many of the changes that took place in the tortoise's metabolism are reversed – in addition, a chemical called glycogen is released into the blood stream. This provides the tortoise with an energy 'boost' and the tortoise must begin eating before this initial boost is used up. The tortoise only gets this boost once, and **must not** be put back into hibernation once it has woken.

It is important to plan well in advance where the tortoise will hibernate – it needs to be cold enough for it to hibernate properly, but also not expose it to the risk of frost. A room in the house is unlikely to be suitable, as what feels cold to you, will almost certainly not be anywhere near the **4°C to 5°C (39°F- 41°F) optimum temperature** for a hibernating tortoise. A dry cellar, free from flooding, could work very well for a hibernation location, but do check that heat from the house does not make the cellar too warm. Brick built garages or outbuildings may also be suitable. Lofts and attics are generally not suitable as they are prone to major fluctuations in temperature. Don't take any chances – **USE AT Least 2 THERMOMETERS**. A greenhouse heater, or similar, which has a frost setting and is thermostatically controlled, is also recommended. The thermostat should be set to come on when the temperature drops below 4°C (39°F) and to switch the heater off if the temperature rises to 6°C (43°F).

#### **Vermin:**

Rats and other vermin will eat a hibernating tortoise – make sure yours is not at risk of attack.

#### **Water:**

The chosen location needs to be dry and not at risk of flooding.

#### **Height:**

Do not place the box containing your tortoise on a high shelf. In the event that the temperature rises unexpectedly, it could climb out of its box and fall from the shelf.

#### **Insulation and Boxing Up:**



Despite careful planning, the weather can vary enormously over a short period of time. In the cooler countries such as the UK it is not unknown to have temperatures in January several degrees below freezing, followed a few days later by sunshine and a temperature of 15°C (59°F). Whilst insulation is important, even excellent insulation will not protect the tortoise fully from freezing or getting too warm, it will only slow down the temperature change. You need to keep an eye

on the weather forecast and the temperature in the hibernation box and be prepared to act accordingly.

Using the double box method is a must – if the temperature drops, the tortoise will instinctively dig downwards to escape the cold. If it digs to the bottom of the box, there will only be a single layer of cardboard or wood between it and very cold conditions, which will not be enough to protect it. An added layer of insulation material such as polystyrene packing underneath the box will give extra protection.

The inner box needs to be big enough to accommodate the tortoise comfortably and to allow it to turn around if it wants. The outer box needs to be large enough so that the inner box can sit inside with a gap of around 2”–3” all the way around. This gap should then be filled with polystyrene packing, shredded paper etc. If polystyrene boxes are available (try vegetable or tropical fish shops) this is even better. Once the tortoise is fully wound down, and is ready to go into hibernation, put a layer of dry soil, or shredded paper on the base of the inner box, and carefully place the tortoise inside.

Do **NOT** use straw, hay, or hemp, as these can harbour spores, and straw and hemp can also have sharp ends. Pack more of the bedding around and over the tortoise, and check that it seems comfortable. Place the probe of both thermometers inside the box with the tortoise, and place the display unit where it can easily be seen. If the thermometers have an alarm, set it now to the safe min and max temperature (3°C (37°F) min and 8°C (46°F) max. Make sure that the boxes have sufficient ventilation, by punching air holes in the top if necessary.



The tortoise may move around quite a lot in the first couple of days as it is settling down and finding its preferred position.

#### **Multiple Tortoises:**

A large chest-type box with lid, which will accommodate all the individual small boxes containing the tortoises, can be made from sheets of polystyrene (the type used to insulate walls and available from builder supply merchants). Each small box, complete with air holes in the lid, should be placed inside and separated from each other by shredded paper. It is essential to use a temperature probe inside each box with the tortoise. See directions above.





### **Hibernating Juvenile tortoises**

The process for hibernating juvenile tortoises is exactly the same as with the adults. However it is worth remembering that due to their comparatively smaller mass they cannot sustain body temperatures as adults do and are more affected by temperature fluctuations.

Hibernation problems in smaller tortoises are far more frequent than with adults; so for that reason, in captivity, it is recommended that the juvenile tortoise should be subjected to a shorter hibernation than the adult tortoise, of no more than 8 to 12 weeks, and the hibernation process should be monitored more closely.

### **Hibernating Russian Tortoises (*Testudo horsfieldii*):**

Russian or Horsfield tortoises originate from harsh climates and are notorious for not settling into hibernation as quickly as other hibernating species. It is recommended that a box made from wood/plywood is used to ensure they do not claw through the sides (but ensure there is adequate ventilation through air holes). Being more resistant to lower temperatures, Russian tortoises require hibernation temperatures at the lower end of the hibernation range of 3°C to 7°C (37°F and 45°F).

### **Checking:**

It is **essential that the tortoise is checked at least once a week** and that the hibernation box temperature is checked every day. Keep an eye on the weather forecast: if the temperatures are very cold, make sure that the tortoises are at **NO RISK OF FREEZING**. Greenhouse heaters work very well in cold weather or the box can be moved to a less cold location temporarily.

If the temperatures are rising and there is a risk of going over the critical 10°C (50°F), move the box to a cooler location. If this is not an option, some frozen picnic bag cool blocks can be used to cool down the temperature inside the box. If using cool blocks, be very sure that the frozen blocks **DO NOT** come into contact with the tortoise. If a lot of movement can be heard from within the hibernation box, especially if the temperatures have risen, it is important to check that the tortoise hasn't come out of hibernation. If it has woken up, it cannot stay there: it must be brought out of box, warmed up and got eating again, and cannot then be put back into hibernation.

Once a week, the tortoise should be checked over to ensure that all is well with it. Removing a hibernating tortoise from its box, checking it over and weighing it will only take a couple of minutes, and will not interrupt hibernation. Just make sure that it is done in a cool area, and as quickly as possible. The check should include the following:

1. Check reflexes – the tortoise will move gently and retract his limbs if touched.
2. Check nose – this should be dry and free from discharge.
3. Check body for any swellings or puffiness.
4. Check the box carefully for any signs of faeces or urination. Passing faeces, especially in the first weeks of hibernation is not a particular worry; however, **if the tortoise has urinated, there is a significant danger that it could dehydrate, and it should be woken up immediately.**
5. Weigh the tortoise weekly and record all weights taken. A tortoise will generally not lose much more than 1% of its body weight per month and should not lose more than 10% of its bodyweight in total. Weigh the tortoise on the day it goes into hibernation, write this, and the date, on the lid of the box, and calculate what a 10% weight loss would be.



Write this down as its 'critical get up' weight. Weight loss should be gradual. If there is substantial weight loss or consistent weight loss which causes concern, wake the tortoise from hibernation (please refer to the Waking from Hibernation document).

**NEVER ATTEMPT TO RE-HIBERNATE A TORTOISE ONCE IT IS OUT OF HIBERNATION.**

It is important when the tortoise is removed from the hibernation box at the end of hibernation that it is woken up using a recognised procedure to keep problems to a minimum.

Please refer to the TPG document on Waking up the Tortoise from Hibernation.