

Tortoise Hibernation: A How-to Guide



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Introduction

Who Hibernates?

Most of the commonly kept species of tortoise in the UK are naturally hardwired to hibernate during the winter months. These species include:

- Hermann's tortoises (*Testudo hermanni* spp.)
- Marginated tortoises (*Testudo marginata*)
- Mediterranean spur-thigh tortoises (*Testudo graeca* spp.)
- Horsfield's tortoises (*Testudo horsfieldii*)

Although in the wild, they would normally hibernate from their first year as hatchlings, we do not typically recommend that beginners attempt this at such a delicate age without careful supervision.

Instead, we recommend that hatchlings up to three years old (or up to 10cm in plastron length) are kept awake during the winter in a heated tortoise table.

Adult tortoises can typically be hibernated safely, provided that they are of a healthy weight, are in good health, and have shown no sign of respiratory issues.

Some tortoises should **NEVER** be hibernated - these include tropical species such as:

- African spurred, or sulcata tortoises (*Centrochelys sulcata*) - not to be confused with the Mediterranean spur-thigh, they're a very different species!
- Leopard tortoises (*Stigmochelys pardalis* spp.)
- Red-foot and Yellow-foot tortoises (*Chelonoidis carbonarius* and *C. denticulata*)
- Hinge-back tortoises (*Kinixys* spp.)

If you are unsure if your tortoise is a species that should hibernate, always ask an expert, be it your local tortoise society, the NCRW, an experienced tortoise vet, or an organisation like the Tortoise Trust!

When Does Hibernation Happen?

As summer turns into autumn, environmental factors signal to your tortoise that the time for hibernation is coming near. These include:

- Lower temperatures, both during the day and overnight
- Fewer hours of sunlight as the days get shorter

Typically, tortoises begin to wind down for hibernation beginning in late October and November, and then hibernate into March.

Why Do Some Tortoises Hibernate?

The reasons that tortoises hibernate in the wild are largely environmental - it allows them to endure periods of drought and food scarcity, as well as of extreme temperature such as in our winters.

Horsfield's tortoises endure even more extreme winters in their native habitats, which give them some interesting quirks when hibernating - more on that later!

In short, it's a natural behaviour for many tortoise species, and while it evolved to help them survive periods of hardship and difficulty, it also has many benefits, most of which are tied to the seasonality of hibernation and to the fact that it acts as the tortoises' own 'pause' button! These benefits include:

- **Slower growth** - being asleep for a certain period of time each year means that they take a break from eating and growing! This allows their body a break and encourages slower, more regular growth, which can improve shell and bone health as well as encourage a longer lifespan!
- **Cellular regeneration** - taking that time out from being active and growing means that the body has time to repair itself more effectively!
- **Natural hormonal fluctuation** - while this is typically associated with breeding, even non-breeding tortoises benefit from the hormonal cues that come with the changing of seasons, as this helps them kickstart their metabolism in the spring and summer

Preparing for Hibernation

By early to mid-Autumn, you should be looking to start preparing for hibernation. This preparation will include:

- Getting your kit together
- Health checking and weighing
- Planning wind-down
- Deciding on what method of hibernation you will use

Your Hibernation Kit

While some of the equipment you use will vary depending on your method of hibernation, there are some things that are essential gear for hibernation regardless of how you decide to go about it!

The Hibernation Box

Regardless of what method you use, you will need a strong box at least 30cm deep and large enough that there is space around the tortoise to allow them to turn around – tortoises will often ‘dig down’ and even rotate in their sleep. We recommend a strong, well-ventilated plastic box with a locking lid, such as a RUB, as these are sturdy and are less susceptible to rodents.

Some people use custom-made wooden boxes. These can be very sturdy, and as long as they are well-ventilated and secure, can also work quite well.



Top Soil

A simple, graded top soil fills is important to your tortoise’s hibernation. Not only does it allow your tortoise to ‘dig down’ and replicate natural burrowing to hibernate, it also provides added moisture to help prevent dehydration, and also acts as an extension of your tortoise’s body mass, further insulating them from the cold.

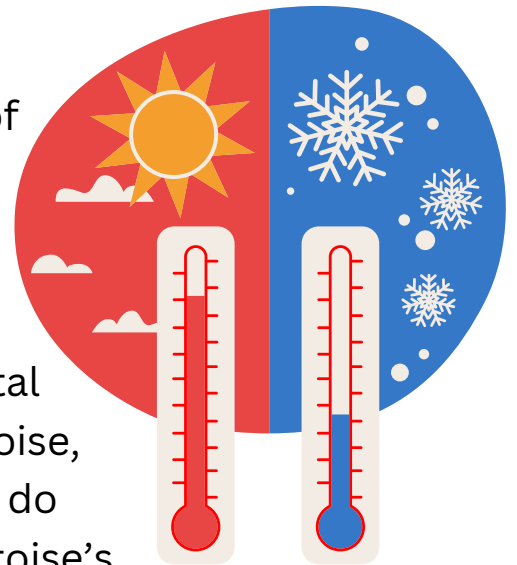
You’ll want a thick layer on the floor of your hibernation box, and once they’re in the box, you can slope up the sides around your tortoise,

which will naturally fall in on them as they dig down – if they do not do this (some tortoises don't, especially if they've only been on shallow substrate), you can gently cover them over with the soil so that they still get the benefit of this insulation.

Thermometers

Perhaps some of the most important pieces of equipment for hibernation are your thermometers – and yes, you should get multiples!

Monitoring temperature is one of the most vital things you can do while hibernating your tortoise, as you need to be sure that the temperatures do not get too warm (risking burning up your tortoise's fat reserves too early or waking them) or too cold (risking frost damage, or even death).



As a result, we recommend that you have **at least two** min/max thermometers kept in the same place as your tortoise's box – this will allow you to monitor temperature regularly, and having more than one will safeguard against one failing.

While remote thermometers that allow you to check the temperature in where your tortoise is without leaving the house can be useful, please make sure this is not your only means of doing so and check in regularly, especially in December and January, when there can be severe drops in temperature at night.

A Set of Scales

One of the simplest things - which you may already have - is a set of scales for weighing your tortoise. This will allow you to weigh your tortoise before hibernation during health checking, as well as weighing them in their box at the start of hibernation and periodically during, as well as at the end.

Being able to monitor your tortoise's weight during hibernation is important, and keeping track of their start and end weight will help you learn what is normal for your individual tortoise.

The Pre-Hibernation Health Check

Before anything else, it is **vital** that each year, you evaluate if your tortoise is healthy enough to undergo hibernation.

There are many ways to do this, and if you have a local tortoise club or society, it is worth getting in contact to find out if they are having a 'Hibernation Health Check' day soon, in which experienced keepers and vets can help verify that your tortoise is fit for this year's hibernation season. It is also recommended – especially if you are unsure about any aspect of the health checking process – that you have your exotics vet give your tortoise a check-up for the same purpose.

However, health checking can start at home, and we've provided a handy checklist of things to go over before preparing to hibernate - if you find problems in any of these categories, consult your exotics vet before proceeding with hibernation!

Appetite

Has your tortoise been eating well during the year?

Recent Illness

Has your tortoise suffered any illness in the past three months leading up to hibernation?

Eye Health

Make sure that your tortoise's eyes are bright and alert, with no signs of swelling or discharge

Nose and Respiratory Health

Check your tortoise's nose for discharge (aka a runny nose), and listen to their breathing for wheezing or other signs of difficult breathing.

Mouth Health

Look inside your tortoise's mouth for signs of infection, including discolouration and discharge, as well as bad smells. A healthy tortoise mouth will be pink!



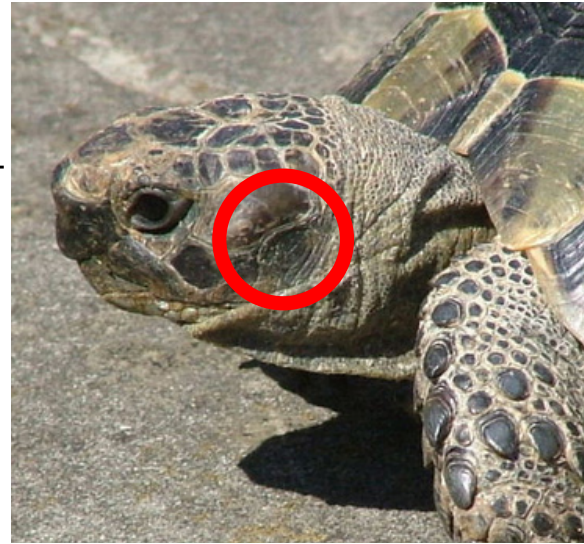
Original photo by Dominik Müller via Wikimedia Commons, CC BY-SA 3.0



Original photo by Richard Mayer via Wikimedia Commons, CC BY-SA 3.0

Ear Health

Check that their ears - which will look like a round, dark scale behind the jaw and eyes - are flat or slightly concave. Swelling or discharge can indicate the presence of an abscess.



Original photo by Richard Mayer via Wikimedia Commons, CC BY-SA 3.0

Shell/Carapace Health

Feel your tortoise's shell, top and bottom for any signs of softness as well as for abrasions or other injuries. Check for any bad smells coming from the shell which might indicate shell rot or similar infection.

Limb Health

Check each of your tortoise's legs for swelling or unusual lumps and bumps which might indicate a health issue, as well as for any injuries. Your tortoise's limbs should be strong and capable of pushing back against you firmly as you do these checks.

Tail and Vent Health

Make sure your tortoise's tail is free of injury and is not showing signs of inflammation such as leaking. In addition, check on your tortoise's urate and poo quality! Urates should range from being runny like egg whites to having a toothpaste-like consistency (never gritty or chalky when fresh), and poo should be solid and moist, but not runny or slimy.

If these checks flag up anything amiss, make sure to get your tortoise checked out by an exotics vet with tortoise experience before attempting to hibernate, as it may be that you need to overwinter your tortoise and keep it awake this year for its health!

There is one more area of tortoise health that needs to be checked up on before you hibernate, but it gets its own section...

Healthy Hibernation Weight

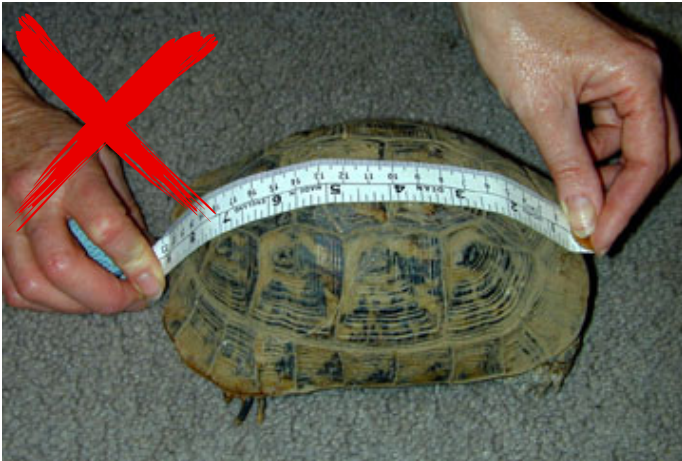
While if your tortoise has been eating well, it should be of a healthy weight for hibernation, it is important to double-check this, and as with other health matters, if you are unsure, don't hesitate to reach out for expert opinions!

For **some** hibernating species, such as the Hermann's tortoises and the Mediterranean spur-thigh tortoises, there is a relatively simple formula to check if your tortoise is a healthy, proportionate weight for its size called the Jackson Ratio Assessment! However, in order for it to work, you **must** make sure you are doing it correctly.

Remember!: This method is **only** usable for Hermann's and spur-thigh tortoises!

Step 1: Measuring Length

When measuring your tortoise's length for using the Jackson Ratio Assessment, you need to take a straight measurement of the shell, NOT a curved one over the surface - a curved measurement will make your tortoise seem longer than it really is!



Photos (C) The Tortoise Trust

If you don't have the kind of measuring device shown above (or if your tortoise is too large for one), there are other ways to get the same measurement.

One of the easiest ways is to face your tortoise against a wall so that its head is retracted, and then mark where the base of the shell is at the tail end. Then you can use a ruler, measuring tape, or meter stick to measure the distance from the wall to your mark.

Step 2: Weighing Your Tortoise

If your tortoise fits entirely on your scales, without any part of them hanging off (and if they will stay put), you can weigh them simply.

If they're a bit larger than your scales, or are uncooperative about sitting still, then your best option is to get something to act as a pedestal (we use a roll of kitchen roll sometimes), clear out the scales, and then pop your tortoise on top of the 'pedestal' to get their weight.

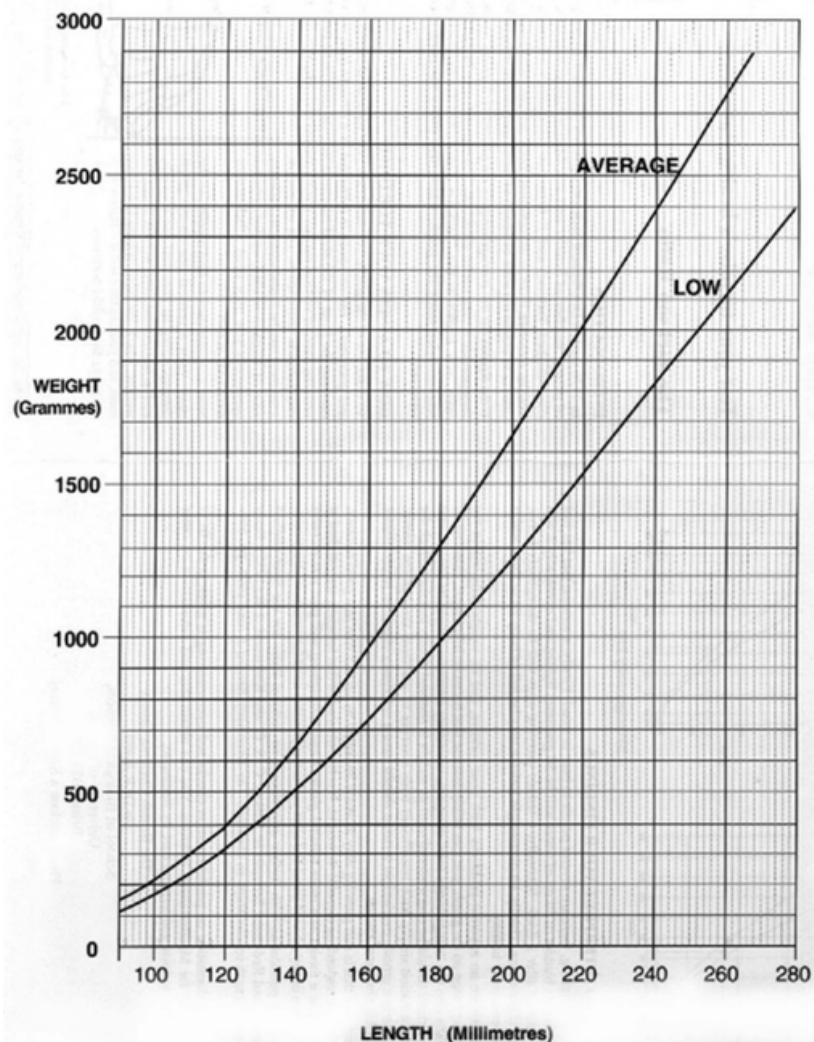
Sometimes, a very full or very empty bladder can cause a tortoise to have a much higher or lighter weight than normal - if you get a weight that doesn't seem right, try again in a day or two to see if a more normal result comes up.

Step 3: Consult the Graph

Once you have your tortoise's weight in grams and length in millimetres or centimetres, you can consult the graph below to see where it falls - ideally, you want your tortoise's weight to fall along the 'average' line.

If your tortoise falls below the 'low' line, it is too light for hibernation and will need to be overwintered instead.

If this feels confusing, don't worry! The Tortoise Protection Group has created an online calculator as well, which you can plug your tortoise's measurements into - we'll provide a link to this in our 'resources' section later on!



Jackson, O. (1976)

But My Tortoise isn't a Spur-thigh or Hermann's!

As mentioned earlier, the Jackson Ratio doesn't work for Horsfield's or margined tortoises. This is due to a difference in body shape compared to the Hermann's and spur-thigh tortoises.

The 'square' shape of the Horsfield's tortoise means that even an underweight tortoise will flag up as either average or overweight, and the elongated body shape of the margined tortoise means that they will usually flag as being underweight even if they are of average weight.

So what do we do about these guys?

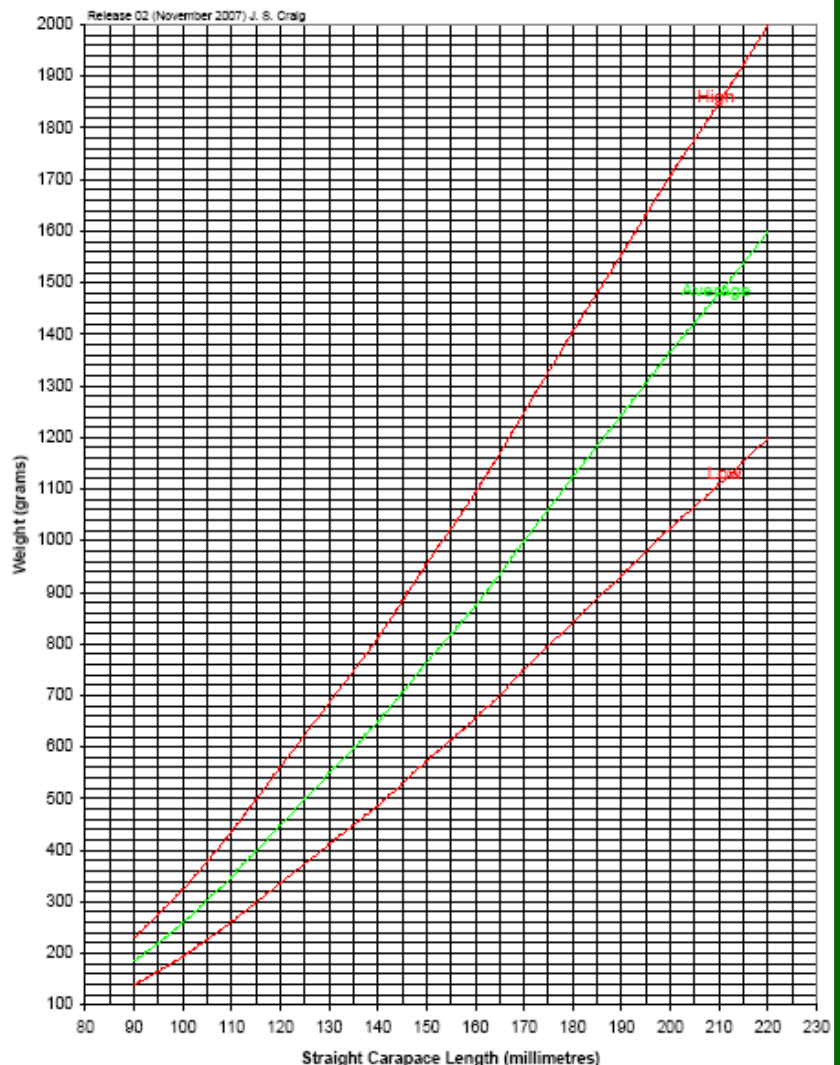
At the moment, there isn't an official way to gauge weight for Horsfield's and margined tortoises, but work is being done to produce these.

One alternate graph is the McIntyre Ratio, which uses the same methodology as the Jackson Ratio, but is geared specifically towards Horsfield's tortoises.

This still leaves us with the margined tortoises - while there isn't an official way to tell for sure, there is at least one calculator online (which we will link in our 'resources' section) designed to calculate body condition based on a series of papers on these tortoises.

If in doubt, seek out the opinion of your local tortoise club or society, the NCRW, or a tortoise-savvy exotics vet.

McIntyre Ratio For Horsfields' Tortoises



Deciding on a Method

A major part of preparing for hibernation will be deciding on what method you will use. We will cover two methods in our guide:

- The Box Method
- The Fridge Method

Each of these methods have their own pros and cons, which we will address in the section for each method.

In general, however, the box method is less equipment intensive and is a long-running method that is especially easier to use with large adults, while the fridge method offers more control and is becoming considered to be one of the safest ways to hibernate when done correctly.

The Wind-Down Period

The next step in your pre-hibernation journey will be the wind-down period, which typically begins in late October and early November, and will require varying amounts of intervention by you depending on the age of your tortoise as well as how you keep them. This is covered in the next section!

The Wind-Down Period

By November, many tortoises have already started to show signs of slowing down and being less interested in food as they enter what the Tortoise Trust UK calls the “hibernation induction period.”

This period is an extremely important part of beginning the hibernation period, and it is important that you pay close attention to your tortoise during this time.

Reducing Light and Heat

If your tortoise is living outdoors, then much of this will have already occurred, as your tortoise will become less and less active, eventually not even wishing to leave their sleeping house or hide.

The Fasting Period

The most important aspect of the wind-down period is fasting your tortoise in preparation for sleep, as you don't want there to be any leftover food in their digestive system while hibernating! The amount of time you need to allow for fasting will largely depend on the size of your tortoise, as a larger tortoise will take longer to fully digest any food left in their stomach.

The following fasting periods work as a good rule of thumb (starting from the date of the last meal):

- **Large tortoises (weighing 2-3kg)** - Approximately 1 month
- **Medium-sized tortoises (weighing around 1-1.5kg)** - Approximately 3 weeks
- **Small tortoises (weighing less than 1kg)** - Approximately 2 weeks

Remember that digestion is temperature dependent! The lower the temperature, the slower digestion will be. The Tortoise Trust recommends keeping your tortoises in the vicinity of 10°C during this time, as it is cool enough to deter feeding, but warm enough that digestion isn't slowed down too much.

Continue to weigh your tortoise during this period as well, as it is important to make sure they aren't losing too much weight while undergoing this fast.

Bathing and Hydration

The other most important part of the wind-down is keeping your tortoise hydrated!

While you're tapering off food, you'll want to be doing the opposite for water, as a tortoise must have an empty gut and a full bladder to make it successfully through hibernation (like us, a tortoise will dehydrate long before it starves)!

So while you won't be offering any food, you should make sure to bathe your tortoise anywhere from 4-5 times a week to even daily, using chin-height, tepid water - splashing a bit of water over the shell and head can often induce drinking, but most tortoises get the picture!

This will both hydrate your tortoise and help it expel urates from its bladder.

Time to Sleep!

So now your tortoise will have gone through its fasting period and is no longer producing any poo, is healthy and of a good weight, and is super hydrated - it's time for hibernation.

As mentioned in an earlier section, we are going to cover the two most commonly used methods, so feel free to read both or flip to the one that you will be using!

- **Hibernation Using the Box Method** begins on **page 14**
- **Hibernation Using the Fridge Method** begins on **page 17**

Hibernation Using the Box Method

Once you've been through the fasting period and your tortoise has reduced its activity, it's time to go into hibernation! If your tortoise is still quite active, it may be worth cooling them for one more week to see if that helps!

While it's the more 'traditional' method presented here, the box method has evolved over time, and due to our every-growing understanding of tortoise biology, it is no longer the risk it once was.

A Note on Temperature

One of the most important things to keep an eye on during hibernation is temperature - this is why we recommend that you have a minimum of two thermometers to check and keep a close eye on the weather reports.

When hibernating, the key is to keep the temperature low enough to prevent them from waking up too early or burning energy, but not so low that they risk freezing. The ideal temperature range for this is between 2-5°C, with Hermann's, spur thighs, and marginated tortoises doing best when kept right at around 5°C day and night. Horsfield's tortoises often prefer slightly lower than this, but you should still aim for the vicinity of 4-5°C for safety's sake.

It is **vital** that during hibernation, your tortoise is **never** exposed to freezing temperatures, even for a short period - if the temperature is due to drop lower than about 2.5°C, it is imperative that you keep a close eye on temperatures, and if it looks like it will drop below this in your hibernation spot, move your tortoise to a safer location (more on this later!).

Likewise, if the temperatures get too close to 10°C, you risk your tortoise waking up or beginning to burn off its fat reserves too quickly, so watching that the temperature doesn't get too high is also important!

Location, Location, Location

There are three guiding principles that should help you pick where to house your tortoise during its hibernation:

- Is it well-insulated from the elements, but not so warm as to raise close to or above 10°C?
- Is it somewhere that you have easy access to so that you can monitor temperatures or - if necessary - move your tortoise?
- Is it somewhere that is safe from intrusions by rodents - rats in particular?

Common choices are brick garages or insulated sheds or out-buildings. In the past, attics were also frequently used, though care must be taken with these to make sure that the tortoise is kept safe both from frost and rodents.

Boxing Day

Before boxing up your tortoise, you'll want to get the box you have as part of your 'hibernation kit' and make sure it's got plenty of ventilation..

Then, as we mentioned in the same section, you'll want to put a thick layer of top soil in the bottom of your box, then place your tortoise on top and add more soil banked up the sides around them. As they move around and 'dig down' over the first few days, they will bury themselves - this is totally natural and helps protect them from getting too cold, and don't worry - they'll still be able to breathe!

Horsfield's tortoises can sometimes spend the first 2-3 weeks of hibernation still moving around and digging down - this is a quirk of the species, and **not** a sign that they're not going into hibernation. Leave them be and they'll settle in on their own.

Once you have placed the lid on the box and secured it, you may wish to 'double box' your tortoise. This can provide additional insulation and protection from rodents. It won't hurt your tortoise to do this, provided both boxes are well-insulated, and the extra peace of mind can be worth it! This outer box may be plastic, cardboard, or wood, and the space between the inner and outer box edges can be filled with insulation material such as shredded paper.

Monitoring Your Tortoise

While you **DO** want to frequently check in on the temperatures where your tortoise is located and make sure that all is well, it is **very important** that you do **not** poke, prod, dig up, or otherwise disturb your tortoise at this time!

If you weighed your tortoise's box as you first put it away for hibernation, you may weigh them in the box every 3-4 weeks to monitor weight loss (subtracting the weight of the box from the total) - many tortoises lose the most mass in the first month of hibernation, but as long as no more than 1% of weight is lost per month and no more than 10% of its weight in total.

How Long Should You Hibernate?

This a very good question, and is one that can vary from tortoise to tortoise. The Tortoise Trust suggests a minimum of 8-10 weeks for small tortoises, and no more than 16 weeks for even larger tortoises. However, some tortoises - especially large, mature spur-thighs will often go for longer.

We recommend keeping a closer eye on your tortoise as the end of February and beginning of March draws near, as this is when most tortoises will begin rousing from their slumber.

Hibernation Using the Fridge Method

Once you've been through the fasting period and your tortoise has reduced its activity, it's time to go into hibernation! If your tortoise is still quite active, it may be worth cooling them for one more week to see if that helps!

The fridge, or refrigerator method is one that has become more and more common in the modern age, and is considered potentially one of the safest ways to hibernate if done correctly!

One of the reasons for this is the fact that refrigerators have the ability to provide much more stable temperatures, even when the surrounding room rises to a temperature above that which would normally wake them up!

On the other hand, it is important to remember that a refrigerator cannot protect an animal if the surrounding temperatures fall below freezing, so make sure that your hibernation fridge is kept somewhere where the temperatures will **always** remain above freezing - even a room that stays at 10°C or above is perfect compared to a room that might drop too low.

A Note on Temperature

One of the most important things to keep an eye on during hibernation is temperature - this is why we recommend that you have a minimum of two thermometers to check and keep a close eye on the weather reports.

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It is **vital** that during hibernation, your tortoise is **never** exposed to freezing temperatures, even for a short period.

What Kind of Refrigerator Do I Use?

Here are some things to keep in mind when choosing your hibernation fridge:

- More modern units have more reliable thermostats
- A unit without an icebox eliminates the risk of a malfunction causing the unit to ice over on its own
- How many tortoises are you hibernating? If only hibernating one or a few small tortoises, a drinks chiller-style fridge or mini fridge may be sufficient for your needs!

Setting Up Your Hibernation Fridge

You should turn on (if not already on) and test your fridge well before hibernation time. This will let you know what settings you need to use well ahead of time!

The first test to run is to see what temperatures your fridge maintains while totally empty. Put a thermometer of known accuracy in the fridge and monitor the temperature over a few hours. You'll probably see lots of fluctuation - don't worry!

In the second test, you'll want to use a mock-up of your box (with topsoil in it) along with some filled water bottles to increase mass and stabilise temperatures around it. Leave your thermometer on the surface of the soil in the box and monitor the temperature for another 24-48 hours.

This will help you tweak the thermostat settings so that you're sitting at around 4-5°C consistently!

Boxing Day

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Humidity and Air

Humidity in refrigerators can sometimes drop a bit low, so adding a shallow water tray to the refrigerator with sponge material can help keep these levels up. Most species do just fine with 50-60% humidity, but more arid species, like the Horsfield's tortoise, can be happy at only 40% or even a little less!

But what about air? Can they breathe in the fridge?

The short answer is yes! But they will need someone to open the fridge once a day for a minute or two to allow for some fresh air circulation. It's that simple!

Monitoring Your Tortoise

While you **DO** want to frequently check in on the temperatures where your tortoise is located and make sure that all is well, it is **very important** that you do **not** poke, prod, dig up, or otherwise disturb your tortoise at this time!

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Waking Up for Spring

Wake-Up Call

While there will always be a few early or late risers, tortoises do tend to start waking up around early March, when the days start getting a bit warmer and the first rays of spring sun begin to creep through.

To begin the 'waking up' process, bring your tortoise in its box into a warmer location to allow them to slowly warm and wake up over the next few hours or days (every tortoise is different - some wake up quite quickly, others take a little more time) - as they wake up, they'll begin moving around again.

While they're doing this is the ideal time to make preparations for their waking back up (see the next section).

Once they're awake, you can proceed with the next steps of getting them warmed up, hydrated, and feeding again.

Preparing for Spring

One challenge for tortoises in the UK is that our springs tend to be a bit more cool and damp than those in their native habitats, and so making sure that they're able to warm up enough upon waking can sometimes be tricky.

If your tortoise lives primarily indoors, then this challenge is easily solved - simply set up your tortoise table while they are waking up, and start by setting the heat to about 22-24°C, then slowly increasing the heat and length of time the lights are on over about 10 days until you are back at normal basking heat levels of 26-28°C.

If your tortoise is a garden tortoise most of the time, then there are a few ways you can help them get up and going in the spring!

Option 1: Warming Up Indoors

For many tortoises, warming up in an indoor room with a basking lamp can help them get a jump start on reacclimating to being awake. This lamp should be set for a basking temperature of 28-30°C, and the Tortoise Trust recommends a 150w lamp with a reflector suspended

about 40cm (15in) above the top of the tortoise's shell.

While we do not often use this method, we have employed it during especially cold springs as our oldest sanctuary tortoises woke up, began eating, and prepared to venture back outside.

Option 2: Warming Up Outside

Another option, which may be a bit more feasible for many garden tortoises - especially large females, is the use of a cold-frame or greenhouse to help enhance heat availability.

The most obvious way to do this is by purchasing or building a cold-frame or portable greenhouse (even the plastic ones work pretty well, so long as you leave an entrance for them).

In a pinch, however, a repurposed aquarium can also act as a mini greenhouse! By laying it on its side where the best sun coverage will be and placing a flat bit of rock in the 'bottom' you can create a miniature greenhouse that your tortoise can use to get extra heat.

Good Hydration

Probably the most important thing to do once your tortoise has woken up is make sure that they get rehydrated. In the initial time after waking, this is far more important than eating, as drinking will both rehydrate them and flush out built up toxins in their system!

Once they've woken up, bathe your tortoise at least once a day for 10 minutes in lukewarm water to encourage drinking. If they're primarily outside, you may want to dry them off afterwards as well and provide a shallow tray of water that they can climb in and out of at will during the day.

What About Food?

After a couple days of warming up and hydrating, your tortoise should begin eating again. If their appetite takes time to pick up, they may not be warm enough, so check out your temperatures and adjust if needed.

If your tortoise hasn't eaten within 7 days of waking, please consult your vet, as it may be that there are other issues afoot!

Common Issues in Hibernation

While most hibernations go off without a hitch, there are some common problems or issues to keep an eye out for!

Excessive Weight Loss

During hibernation, tortoises can lose as much as 10% of their body weight! Many people will calculate out what that number is for their tortoise (e.g. a 1kg tortoise can safely lose 100g, so that tortoise could safely drop to 900g) and write it on the outside of their box so that they know what his low-end weight can be - if they dip below this, you'll need to wake them up using the 'wake up' procedure and keep them indoors for the remainder of the winter. Likewise, if you find your tortoise has lost significantly more than 1% of its weight in a single month or even shorter period, this may be cause for concern.

Urination

While rare, there are occasions (usually related to it becoming too warm) in which a tortoise might empty its bladder during hibernation. If this happens, you **must** wake your tortoise, as they risk dehydration otherwise.

What if I Need to Move My Tortoise?

As mentioned throughout this guide, there are two major outside threats to a tortoise in hibernation: frost and rats. Should you ever have reason to believe that the location your tortoise is currently stored is not safe from one of these two threats, it is **imperative** that you move your tortoise to a safer location!

For many years it was thought that moving a tortoise in hibernation was dangerous and disruptive, but this is a **myth** and as long as they are moved to somewhere that maintains temperatures and is safe from rodents, they will be just fine! It is far more important to ensure the safety of your tortoise through the winter.

Resources on Hibernation

In this section, we're hoping to provide useful links that can help you with further understanding hibernation and tools for getting going (and further information if you want to get nerdy about it)!

All of these are reputable sources which we have used ourselves in the past, and can be trusted.

General Hibernation Resources

- The Tortoise Trust, "Safer Hibernation & Your Tortoise":
<https://www.tortoisetrust.org/articles/newhibernation.html>
- The Tortoise Trust, "Refrigerator Hibernation for Tortoises & Turtles":
<http://www.tortoisetrust.org/articles/Refrigerator.htm>
- The Tortoise Trust, "Overwintering Tortoises":
<http://www.tortoisetrust.org/articles/overwinter.html>

Health Check and Weight Calculator Resources

- The Tortoise Table, "Signs of a Healthy Tortoise":
<https://www.thetortoisetable.org.uk/tortoise-health/signs-of-a-healthy-tortoise/>
- The Tortoise Protection Group's Jackson Ratio Calculator:
<https://www.tortoise-protection-group.org.uk/site/171.asp>
- Condition Calculator for Spur thigh, Hermann's, and margined tortoises: <http://www.ahailey.f9.co.uk/cond.htm#calc>

Facebook Groups and Support

- Tortoise Life @ the Norfolk Tortoise Garden [advice from an experienced, naturalistic keeper of many different species]:
<https://www.facebook.com/groups/455016151348569>
- Tortoise Hibernation Group UK - Mediterranean Species [a group aimed at first-time hibernators who are nervous about the process]:
<https://www.facebook.com/groups/tortoisehibernationgroupukmediterraneanspecies>