INTRODUCTION

The tortoise is a living fossil having survived since the dawn of the age of reptiles, 200 million years ago. Collection for exportation and habitat destruction have dramatically reduced populations in their native countries around the Mediterranean like France, Spain, Italy, the former Yugoslavia, Turkey, Greece and northern Africa. In Britain, with wet summers and cold damp winters, they are outside their distribution range, but if basic guidelines are followed, a captive tortoise can have as long and happy a life as possible.

GENERAL ANATOMY

A tortoise's body is surrounded by a protective shell with an upper part (the carapace) and a lower part (the plastron), both of which are made up of individual bony plates and horny scutes. The upper and lower parts of the shell are joined by bridges between the fore- and hind limbs. The vertebrae of the backbone are fused to the carapace, as are the scapulae (shoulder blades) and pelvis (hip girdles). The lungs are located in the top third of the carapace and below are the other body organs. The lungs during breathing are inflated and deflated using the muscles of the front legs. Tortoises like most reptiles, are ectothermic and rely on an external heat source (the sun) to raise their body temperature sufficiently for them to be alert, feed and digest their food. They are inactive in cold weather.

HUSBANDRY AND HOUSING

Tortoises like roaming about, so if possible make the garden completely escape-proof. Walled gardens are ideal but if you have to pen your tortoise in, allow at least 10 square metres per tortoise and make sure that the animal can neither climb over nor burrow under the surround. Wire or wooden pens should be at least 40cm (16 ins) high, buried to a depth of 10cm (4 ins), with wooden stakes as support. Garden ponds should be adequately covered to prevent risk of drowning. A well ventilated greenhouse with access to a clover lawn and a paved sunbathing area is ideal for tortoises as in both spring and autumn the animals will be able to heat up sufficiently to feed well, thereby extending their year and shortening their hibernation period. A lower pane of glass can be replaced with a panel of wood with an entrance hole or cat flap in it, thus ensuring that the tortoises can escape from overheating on the hottest summer days. Never attempt tethering a tortoise by string round the leg which will cut off blood circulation and may result in gangrene or by boring holes through the shell, which will cut through live tissue and cause pain or infection. A waterproof house in a sunny position is essential to protect the tortoise from extremes of cold, wet and heat. It should be of a wooden construction, preferably covered with roofing felt and be slightly raised to prevent the floor from becoming damp. It can be lined with thick newspaper or dried leaves. If you have several tortoises, it is advisable to separate the males and females as the males often engage in female shell-butting and leg biting as part of their courtship. Females constantly exposed to this treatment and unable to escape will feed less, produce eggs less
frequently and will eventually suffer from extensive shell and leg damage with an increased likelihood of infections.

**WATERING**

Contrary to belief tortoises do drink, especially on waking from hibernation, when a warm bath is usually appreciated. A shallow dish about 10 cm (4 ins) deep, should be sunk into the ground to allow the animals to submerge their heads into the water. Allow for easy access into and out of the dish.

**FEEDING**

Tortoises need a diet which is high in dietary fibre, vitamins and minerals, but low in fat and proteins and feed mainly on green leaves. If your tortoise has the run of a garden it will forage quite successfully for itself on Dandelion, Trefoils, Honeysuckle, Cat's ears, Vetches, Sow thistle, Hawk bits, Hawkweed, Plantains, lover (Red & White), Pansies, Rose Leaves and petals, Hibiscus, Mallows, Grape vine leaves, Agave plant, Mulberry leaves, Bindweeds, Opuntia cacti pads and fruit, Roman or red leaf lettuce, Watercress, Endive, Escarole and Chicory. Beware of weed killers and slug pellets. In the wild, tortoises are opportunistic feeders and they will on occasion tackle carrion and dung. Their digestive systems are, however, geared towards the digestion of leaves, including cellulose, so a wide variety of greens must be offered and the diet should be as varied as possible with leaves, vegetables and as well as proprietary vitamin and mineral supplements such as Vionate or the Vetark range (Arkvits, Nutrobal AceHigh) obtainable via most veterinary surgeons or via a very good pet shop. The following foods can be tried: cabbage, Beet greens, Kale, Alfalfa Hays and finely chopped carrots but should only be offered occasionally. A varied diet is recommended and one guided by the wild situation.

**EDIBLE AND NON EDIBLE FLOWERS FOR TORTOISES**

To ensure a balance please grow as many different varieties as you can

**Garden Plants**

- Malva - (mallow) leaves & flowers
- Lavatera - (mallow) - flowers & leaves
- Nasturtium - leaves & flowers
- Hibiscus - Flowers especially, also leaves
- Gazania - flowers & leaves
- Aubretia - leaves & flowers
- Wallflowers - (ersimum annual & biennial varieties) leaves & flowers
- Sedum spectabilis - leaves (other pink flowered alpines sedums are also consumed)
- Kalanchoe - leaves especially
- Pansies - leaves and flowers
- Hosta - leaves
- Hemerocallis - (day lily) flowers
- Anagallis Linifolia - (annual) leaves & flowers
- Sempervivum (house leeks) - leaves
- Meconopsis Cambria (Welsh Poppy) - leaves & occasional flowers
- Mesembryantemums (annual) - flowers & leaves
- Nemesia - leaves & occasionally flowers
- Rose - petals only
- Mimulus (annual) - especially flowers
- Petunia - leaves & flowers
- Perennial Geraniums (alpine & dwarf) especially flowers, leaves also eaten
- Sweet Woodruff (galium odoratum)*
- Mysotis (forget-me-nots) - leaves consumed occasionally
- Pelargonium - leaves & flowers
- Begonia Semperflores - flowers & leaves (suggest avoid all tuberous begonias however, as may be toxic)
- Echolozia (californian poppy) - flowers
Ameria (thrift) - flowers
Antirrhinum - leaves & flowers
Osteospermum - flowers & leaves eaten occasionally
Hebe - round or dark leaved varieties may be nibbled*
Fushia - leaves & flowers eaten occasionally
Corepsis - flowers
Tagetes - Flowers
Mimulus Aurantica - flowers
Cornflower - leaves nibbled with young plants
Opunia Cactus - spineless or semi spineless varieties
Agave

**Poisonous Plants**

Keepers can be very worried about tortoises eating poisonous plants. In reality, the risk is small as tortoises will naturally avoid them.

Occasional cases of poisoning, even death, have been recorded through accidental ingestion of some garden plants, and it is therefore best to exclude these from tortoise habitats, or at the very least ensure they are not grown in close proximity with edible plants and weeds.

As a guide, common plants to be avoided include: Dafodil-Narcissus-Hellebores-Hypericum-(often called Rose of Sharon, not to be confused with the Hibiscus variety Rose of Sharon which is quite edible)-Hydrangea-Convallaria (lily of the valley)-Euphorbias-Digitalis(foxglove)-Nicotiana (tobacco plant)-Rhododendrons & Azaleas- Ragwort (senico)-Crocus-Dicentra (bleeding heart)-Lupin (Lupinus)-Vinca(periwinkle)-Peony(peonia)-Rhubarb-Misletoe-Aconite & Lobelia. In general plants which grow from bulbs, tubers & corma should be excluded as many although not all, are potentially toxic. Conifers which produce needles or pine cones should also be avoided.

However, if you see your tort nibbling a few leaves of, for example, sweet peas or impatiens (busy lizzies), don't panic. Many plants which are often listed as toxic are, it would appear, safe when taken in small amounts as part of a varied diet.

**SEXING:**

Female  Male

**Hibernation.**

During August and September, as the days grow shorter, the light intensity decreases, the temperature begins to fall and tortoises prepare for hibernation. Feeding declines: it takes 4-6 weeks for their gut to empty for winter, and before they start this process in early September the tortoises need a check over. Make sure there are no signs of wounds, abscesses, infections internally or externally, also that the mouth is clean and pink, the eyes alert and bright. Ensure their weights and measurements correspond with the Jackson ratio, clear away any faecal matter adhering to the shell or tail.

**Overwintering.**

Any tortoise which is underweight or suffering from an ailment should not be hibernated, but over wintered in a Tortoise Table. This should have a heat source and full spectrum light for 13-14 hours to
prevent hibernation. The temperatures should be 26°C (80°F) by day and 18-22°C (65-70°F) at night. Fresh food and water should be provided. A simple tortoise table can be provided with the light source on one end and a shelter on the other. Never allow the temperature to go below 15°C (60°F).

**THE HIBERNATION QUARTERS.**

Use a large, wooden, rodent-proof tea-chest or box, with small airholes in the sides. Both the top and the holes should be covered in wire mesh to prevent vermin entering. Line the base and the sides of the box with thick pads of polystyrene or newspaper. Place the tortoise in an inner box with airholes and filled for one to three quarters with polystyrene chips, dry leaves or shredded newspaper. Avoid hay or straw. Place the smaller box inside the larger one, making sure you can open it easily for check-ups. The tortoise can be carefully weighed individually or complete with inner box on a weekly or twice monthly basis. An adult tortoise loses about 1% of its pre-hibernation weight so a 1000g tortoise is allowed to lose 10g monthly. A drastic weight loss indicates something is wrong: the animal should be brought out of hibernation immediately and checked. Make sure the tortoise is hibernated in a frost-free environment, at temperatures of 4-10°C (36-50°F). Tortoises kept below freezing point can lose their eyesight or at worst their lives. Use a maximum and minimum thermometer (obtainable from garden shops) to check temperature changes. For every drop of 10°C the heart rate drops 50%. At 40°F the respiratory movements are negligible. If the tortoise is kept too warm and becomes too active it will use up its fat and of glycogen or animal starch stored in the liver, the latter is needed on emergence from hibernation.

**EMERGENCE FROM HIBERNATION.**

Start checking your tortoise from the end of January onwards. When the animal starts moving take it out of its hibernation quarters.

1. Bring it out of hibernation slowly, check for discharges from the nose, eyes and tail end.
2. Inspect it carefully, bath the face and eyes and wash the mouth.
3. Give the animal a warm bath for at least half an hour. It is important that the tortoise empties its bladder to get rid of the toxic waste accumulated during hibernation and that it replenishes its water supply by drinking.
4. Keep the animal warm during the day and indoors overnight until the nights get warmer.
5. Once out of hibernation and eating, keep it active (as for over wintering) if the weather becomes cold again. Warm spells in February breaking hibernation are a hazard of the British climate. Any tortoise not feeding or appearing ill should be taken to veterinary surgeon without delay.