

HerpVet Information Services

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Vivarium Substrates

This information sheet is a brief discussion of the various options for the substrate in your vivarium (what you put on the floor to line it). The emphasis is very much on a purely terrestrial (land) set-up, although many comments will be relevant to the land part of a semi-aquatic set up.

I should put in the normal notice here - there are many different ways of doing things in the herptile hobby, and there are rarely absolute definitive answers. What follows is my opinion - but it's an opinion backed up by seeing the problems caused by various substrates.

Substrates can be broadly divided up into two main types; particulate types (ones made up of multiple small particles, e.g. sand, gravel, cat litter, wood chips etc) and non-particulate types (such as newspaper sheets or astroturf-type matting). I will discuss several of these. **For most circumstances, non-particulate substrates are, in my opinion, generally superior for housing pet reptiles**, although they do require more effort to create suitable microclimates (see below). One often useful compromise is to have an area (preferably contained, e.g. a cover cat-litter tray type arrangement) with particulate substrate in a vivarium with newspaper or astroturf matting as the main substrate.

General comments

Obviously the choice of substrate will depend to a certain extent on the vivarium structure and on the species of animal. However, there are certain desirable properties that a good substrate should have. It should be:

- **Safe** for the animal; problems may arise from **direct toxicity**, as with certain resinous woods or treated papers, **skin damage/abrasion**, as with certain types of sand (especially for unsuitable species), and **swallowing the substrate**. They may also be **a source of various bugs**. This is one area where particulate substrates are especially poor – I have seen gut blockages with virtually all particulate substrates, including many described as digestible, which is the main reason why I don't like them as a rule. You can usually ignore the description as "safe if swallowed"; they may be if only a small amount is taken in by mistake with food, but if the animal is eating the substrate deliberately (as it may do if its body is telling it that it is mineral deficient) then it will potentially block up, and this will not infrequently be fatal.

- Provide a suitable range of **microclimates** (localised areas of specific temperatures and humidities). Providing a range of these allows the animal a better chance to find one which suits it (which may vary with time of day, state of shedding and other factors). Here particulate substrates tend to have the advantage; however, this can be compensated for by increased hiding places and humid caves where the substrate is non-particulate.
- **Hygienic**; the dirtier its environment, the more difficulty the animal will have in staying healthy. Again, this is far more of an issue with particulate substrates – in practice they are simply not going to be changed as often as newspaper or astroturf can. Taking out faeces/urine when they are passed helps but is not fully effective – the animal is very likely to have moved through the waste, spreading bugs from it throughout the substrate.
- **"Absorbent"**; The animal should ideally not be able to lie in its own faeces/urine. Again, particulate substrates are generally better from this point of view.
- **Suitable for the animal's natural behaviour**; burrowing species should have the opportunity to burrow, for example. Obviously particulate substrates are generally better for this.
- Less important for the animal, but of practical relevance; **cheap, reasonable in appearance, and readily available**.

Specific Substrates

Newspaper is cheap, readily available, and very easy to change. The drawbacks include its limited ability to absorb fluid and its appearance. It can also be a problem in small/hatchling reptiles, as it does not give them a good grip, and can give them difficulties getting around. Note that local newspapers where the ink is still virtually running off the page should be avoided.

Astroturf-type matting, of which various grades are available, is generally very good. Herbivorous animals may try to eat it, however, which could lead to gut problems.

Corn cob granules are very frequently (in my experience) a problem, because the animal eats them. They suffer from all the drawbacks of litter-type substrates

Bark/wood chippings/shavings, if suitably sized, are one of the better litter-type substrates available, but they do of course suffer from the general drawbacks of these. They may be associated with transferring mites from pet shops in some cases, although this should not happen if they are in sealed bags.

Gravel has the advantage of being inorganic, so is relatively good from a hygiene point of view. It is also relatively easy to take out and clean/disinfect, which helps. However, it doesn't allow burrowing very much, thus lacking one of the major advantages of litter-type substrates.

Sand can be useful, if it is of the correct type (rounded particles, such as silver sand, or calcisand). However, it has the general disadvantages of litter-type substrates – contrary to what many pet shops will tell you, it can (and quite commonly does) cause impactions.

Sawdust has all the drawbacks of litter type substrates, with the added disadvantage of being (potentially) very dusty. It is therefore usually a poor choice.

Vermiculite, like gravel, has the advantage of being inorganic, a definite plus from a hygiene point of view. It is also light and reasonably good at retaining moisture, and is therefore one of the best litter type substrates for many uses.

Peat has the potential drawbacks of litter-type substrates, especially the potential for mould growth. It also has the potential drawback of being relatively acidic – possibly significant if in contact with water.

Soil is similar to peat, without the acidity (usually). However, the source is important – if used from an outside source, it could potentially be bringing in all sorts of problems.

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