

## **Sand ingestion and Sand impaction**

### **~ Silent killers ~**



With the continuing drought and diminishing grazing, farmers are forced to supply their animals (livestock and game alike) with supplemental feeding. As the grazing deteriorates, animals are forced to graze down to ground level, which inadvertently leads to some sand ingestion. This can lead to secondary intestinal sand impaction, which has been reported in a wide variety of animals, including cattle, horses, rhinos, elephants, antelope, giraffe and ostriches.

In this article we explain more what sand ingestion/impaction is, what it can do to an animal, and how you can prevent it.

### **Predisposing factors**

Pica is an eating disorder where an animal nibbles on substances with no or hardly any nutritional value. Examples of pica are the eating of bones (osteophagia), or eating soil (geophagia). This behaviour is likely associated with some nutritional deficits (e.g. phosphate deficiency or starvation). For more information on feeding behaviour and food selection, read '[Change, the driver of feeding behaviour in \(wild\) animals](#)'.



*Figure 1 White rhino eating the last straws of lucerne of the ground, thereby possibly also ingesting sand*  
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Animals can, however, also ingest sand unintentionally when sand adheres to food (poor quality and/or sand contaminated hay) or where soil is ingested directly by eating hay from sandy soil. Animals forced to eat a pasture all the way down to the grass's roots, as under drought conditions are also at risk.

### **What does the sand do to the animal?**

Sand in relatively low quantity is irritating to the intestinal mucosa, often causing diarrhoea. Since sand is heavier than normal intestinal content, it accumulates in the lower parts of stomach/intestine. This causes distension (swelling) and eventually impaction (blockage), thereby disrupting the normal peristalsis of the intestine.

### **Symptoms**

Animals suffering from the effects of sand ingestion may show one of two main presenting signs:

- 🐾 In milder cases of sand ingestion sand irritation to the intestinal mucosa, it can cause diarrhoea which can be constant, or coming and going (intermittent).
- 🐾 Animals with sand impaction usually appear dull and weak in the hind legs (reluctant to rise or move when approached). In addition to the above, they are listless and have a reduced appetite. They may show signs of abdominal discomfort (colic); the animal keeps looking at the abdomen, kicking at the belly, stretching the abdomen, constantly lying down and standing up, not passing any manure, pawing and rolling.

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## Diagnosis

A clinical diagnosis can be challenging. Symptoms as well as observation of the feeding routine, habitat and grazing quality should raise suspicion.

An easy but unreliable test is to shake up equal volumes of faecal balls with water and then observe sand sedimentation after a minute or two (Figure 2). Since sand is heavy, it will settle at the bottom, while the rest of the faecal matter will settle on top. However, be aware that this test can be negative in animals suffering from severe sand impaction and it does not tell us how much sand has accumulated in the intestines. An X-ray of the lower abdomen may (need a very powerful machine – not easy in field) demonstrate sand accumulation.

In dead animals, an autopsy with thorough examination of the gastrointestinal tract will show mucosal irritation and ulcerations in the abomasum (ruminants) and colon/caecum (equids and rhinos). Sand accumulation (can be up to 10 – 50 or more kg, depending on species) will be evident in the abomasum and intestines (ruminants) and caecum/colon (equids and rhinos) (Figure 3, Figure 4). Depending on the species, the involved abdominal organs will be swollen/distended and feel hard or doughy. Occasionally sections of the small intestine may also be blocked by sand, resulting in severe distension of intestines before the blockage.



Figure 2 This is the colon content from rhino shaken up in water. You can see the content is nearly 100% sand. © U. Tubbesing



Figure 3 Sand impaction of the colon in a white rhino. Figure 3 shows how much sand was in the colon content, compared to faecal matter © U. Tubbesing



Figure 4 Enlarged abomasum of a giraffe, filled with sand © [HO Jegede et al \(2015\)](#)

If sand contaminated hay, silage etc. is considered as the cause of sand impaction, one should analyse the food for total ash content. Soil contaminated food will yield abnormally high ash content (sand does not burn and is then measured as ash).

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## **Treatment**

There are different opinions regarding the treatment and effectiveness thereof of n cases of sand impaction. In wild animals the diagnosis will most likely only be made during an autopsy or based on suspicion. Effective treatment usually requires intensive “hands on” management which is impractical in game, but may be considered in horses and cattle. Treatment recommendations mentioned in the literature include:

Repeated administrations of “Equisyllium”, a high-fibre laxative is a popular choice in horses, with claims that the fibre swells up in the stomach, collects the sand and moves it through the digestive tract to be passed in the manure. However, studies conducted at the Universities of Illinois and Florida concluded that psyllium had no apparent effect on sand removal from a horse’s large intestine. The University of Florida feeding trial concluded that *feeding large amounts of hay (2.5% of body weight) uniformly produced the largest sand output*, even when compared to the combination of high a fibre diet with additional “Equisyllium”.

Other studies feeding wheat bran and dosing with mineral oil to remove sand have also proved ineffective. In some cases, surgery is needed.

## **Prevention is always better than a cure!**

Always make sure your animals receive a well-balanced diet. This will reduce the inclination to nibble on the dirt, bones etc.

Wherever possible, avoid overgrazing to prevent animals eating too close to the ground (esp. important in sandy areas). If you have to give supplemental feeding, avoid feeding directly from the ground since this will increase sand contamination of food and sand ingestion.

3

- 🐾 Feed off the ground as much as possible:
  - Feed in hay stacks and use a rubber mat under feeding areas to catch the feed that inevitably falls on the ground. This also minimises wastage of expensive food (Figure 5).
  - Feed on rubber covered (conveyor belting) ground away from sandy areas. Please note that these do get very hot in the sun thus place in shady areas!
  - Feed on natural rock surfaces (if available)
  - Provide feeding bowls (Figure 6)
- 🐾 Provide multiple feeding spots spread over a wide area to ensure all animals get a chance to eat.
- 🐾 A high fibre intake (ideally in unlimited quantity on farms with sand ingestion problems) is a high priority since the high fibre content will assist with sand removal from the gut.
- 🐾 Since dehydration will exacerbate intestinal impaction always provide plenty of fresh water.



Figure 5 Put rubber mats/conveyor belts under your hay stacks, to reduce wastage, and sand ingestion © M. Bijsterbosch

For more information on feeding game in the drought, read [‘Feeding wildlife during the drought’](#)

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*Figure 6 Some examples of feeding off the ground under (semi) intensive circumstances. When you use feeding bowls, make sure you have enough feeding bowls for all animals, and make sure there is enough space between each bowl © M. Bijsterbosch*