SIYABONA AFRICA

Main

Kruger National Park
Sabi Sands Game Reserve
Timbavati Game Reserve

Kruger National Park Luxury Safari

Cultural Luxury Safari
Deluxe Safari Escape
Luxury African Bush Safari
Luxury African Safari
Luxury Fly-In Safari
Luxury Game Safari
Luxury Lodge Safari
Modern African Lodge Safari
Private Luxury Tented Safari
Spirit of Adventure Safari

Kruger Park Romantic Lodge Safari

Exclusive Romance in Africa
Memorable Luxury Safari
Romantic African Safari
Romantic Wedding Safari

Kruger Park Family Lodge Safari

Child-Friendly Lodge Safari
Ethnic Lodge Safari
Exclusive Family Safari
Family Safari in South Africa

Kruger Park Family Safari

1 day Game Drive Safari
Family Lodging Safari
Kruger Family Camping
Kruger Lodge Safari
Kruger Sabi Combination
Rustic Kruger Safari

Kruger Park Private Concession Lodging

Dung and Droppings Help Explain Dry Season Diet Choices

Picture Gallery >

By Fred de Boer, Martine Kos and Arno Hoetmer

Most animals face changes in how much food there is for them to eat over the year. During the dry season especially, the situation can look bleak when the grasses become shorter and dry up, and the leaves of deciduous trees are falling, leaving the branches bare. This leaves herbivores in a difficult position in the dry season, and one would expect that what they choose to eat reflects these difficult decisions.

One of the goals of the Tembo (The Elephant Movements and Bio-Economic Optimality Programme) research is to understand how the forage conditions affect the dietary composition of plant eaters, especially elephants and impalas, in the greater Kruger region.

For scientists it is not only a question of biomass (the total amount of plant matter in the area), or forage availability (the location of the forage – in riverbeds or hard-to-reach places), but the quality of the plant material, because sometimes forage is not used because of its low food quality.

But why then study these two herbivores? One reason is that both elephants and impala are so-called mixed feeders - they both graze and browse - and are able to switch from a diet composed of mainly grasses to one dominated by browse as conditions change. Hence, these species are ideal study animals to document changes in diet.

Secondly, both species are abundant in the Kruger region and impact on the vegetation. While driving through the Kruger National Park (KNP) or the adjoining APNR (Associated Private Nature Reserves) one sees elephants and impala regularly, but how can one be sure about what has been eaten? According to one of the Tembo scientists, Fred de Boer, “Observations of foraging animals are possible but it is very difficult to document changes in diet.

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Traveler's forecast

Cloudy with showers and thundershower

0 knots

Min: 18C Max: 22C

Waxing

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Plains Camp
Rhino Post Camp
Shishangeni Lodge
Singita Lebombo Lodge
Singita Sweni Lodge
The Outpost Lodge
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Lower Sabie Restcamp
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Satara Restcamp
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Tsendze Rustic Campsite

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Malelane Private Camp
Maroela Private Camp
Tamboti Tent Camp

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Moreover, how does one know whether one bite of grass is the same as a bite from a mopane tree? These direct observations are no longer used by scientists, and we now use other methods, such as faecal analysis. The advantage of this method is that you do not need to see the animal in order to be able to document its feeding behaviour - a couple of spoonfuls of dung are sufficient for a nice analysis.

Of course we collect various samples and mix these to get a more overall Most animals face changes in how much food there is for them to eat over the year. During the dry season especially, the situation can look bleak when the grasses become shorter and dry up, and the leaves of deciduous trees are falling, leaving the branches bare.

This leaves herbivores in a difficult position in the dry season, and one would expect that what they choose to eat reflects these difficult decisions. One of the goals of the Tembo (The Elephant Movements and Bio-Economic Optimality Programme) research is to understand how the forage conditions affect the dietary composition of plant eaters, especially elephants and impalas, in the greater Kruger region.

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While driving through the Kruger National Park (KNP) or the adjoining APNR (Associated Private Nature Reserves) one sees elephants and impala regularly, but how can one be sure about what has been eaten? According to one of the Tembo scientists, Fred de Boer, “Observations of foraging animals are possible but it is very difficult to document changes in diet.

Moreover, how does one know whether one bite of grass is the same as a bite from a mopane tree? These direct observations are no longer used by scientists, and we now use other methods, such as faecal analysis. The advantage of this method is that you do not need to see the animal in order to be able to document its feeding behaviour - a couple of spoonfuls of dung are sufficient for a nice analysis.

Of course we collect various samples and mix these to get a more overall picture, but you can get a pretty good impression of what has been eaten this way. “The faecal analysis is quite time consuming, though.

One needs to treat the samples carefully with several chemicals, also for health reasons, and then you can study the fragments under a microscope. “The nice thing about faecal analysis is that some parts of the plants, such as the top layer

Kruger Park Game Viewing Routes

of the leaves - the so-called epidermis layer - is composed of a cell layer that cannot be digested by the animals.

Animals mainly digest the inner tissue of the leaves. However, the epidermis layer is composed of a nice arrangement of cells, and the structure of these cells differs among species. So if you are able to recognise the epidermis layers of the different species [under the microscope] after learning their characteristics from taking samples of plants you encounter in the field, you can calculate what the herbivore species has been eaten from studying their faeces."

For scientists, it is clear that there is much more than only the differences between grasses and tree leaves. Leaves of different species are different in their composition; some have more nitrogen, others have more phosphorus, and yet others can be digested better. Moreover, some species have so-called "secondary compounds".

These are bad-tasting components, e.g. tannins, which some plants have in order to convince the animals to eat something else. These chemicals defend plants against high levels of browsing, as the impala will probably want to change to another species if a plant does not taste good. However, if that is the case, why then do all herbivores not eat the same stuff, with a high nitrogen content (which equates to good food for a herbivore) and a low tannin content?

"Well, that is one thing we also want to know. One of the important topics is that elephants are large animals and need a large amount of forage, while impala are smaller and need a smaller volume each day. However, there is another important issue. If you are smaller, then you need a diet of a relatively higher quality.

Because an impala's body size is smaller than an elephant's, the volume that can be consumed each day is smaller, but the energetic costs of maintaining the body do not decrease that much,so an impala can eat less, but should compensate for its relatively higher energetic costs by eating food that is of a higher quality than the food of an elephant."

Why is it so important to know what the animals eat and when? "Well, I think for two main reasons. The distribution of the species is an important issue in the management of most conservation areas. Why are there so many elephants in the north of Kruger? I think that you can only understand, and maybe predict, the distribution of a species, if one understands the diet choices it makes - what is suitable forage and what is not?

Secondly, animal densities are another important aspect. Is the food availability or the food quality maybe limiting the species' population growth? This is another important issue that can be studied by these methods." From the wet to the dry season forage availability and quality changes rapidly, and both the impala and elephant deal with this by changing their diet rapidly.

Tembo scientists have found that elephants decrease the proportion of grass they eat from 70 to 25 percent in only a couple of months. However, for impalas this proportion only changed from 95 to 70 percent. Why then do elephants eat so little grass in the dry season?

"We think that elephant can tolerate low quality food, because compared to impala, they can survive relatively well on poor quality forage. Therefore elephants are able to switch to

mopane leaves that might have a relatively high nutrient content, but are known for their high tannin contents.

These tannins probably also decrease the availability of nitrogen for the animal while digesting, but this is a smaller problem for the elephant than for the impala. Impala use other forage species, including other trees, more grass, and herbs.

“We also found that the nitrogen content was relatively high in these areas during our study period, and we therefore expect that it is not the nitrogen content which is triggering the animals’ switch in their diet.

One of the things we found is that the digestibility of the forage – that is the proportion of the plant material that can be digested and used by the animal - is a much better predictor of the diet changes than the nitrogen content, especially for impala, which are more limited by their relatively higher energy needs.

“We now hope that we can use these findings to better understand the choices these animals make and why they change their distribution over the year."

So while it might be preferable for the researchers to do animal observations through an open car window, with a drink at hand, and just watch what the impala and elephants are eating while keeping an eye open for other wildlife, for the Tembo scientists who spend their time picking up droppings and smelly dung, the reward comes after all the dung has been ground up and studied, providing clues into what exactly causes animals to move from one place to another as the seasons change.

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