

PLANTS AND SEX

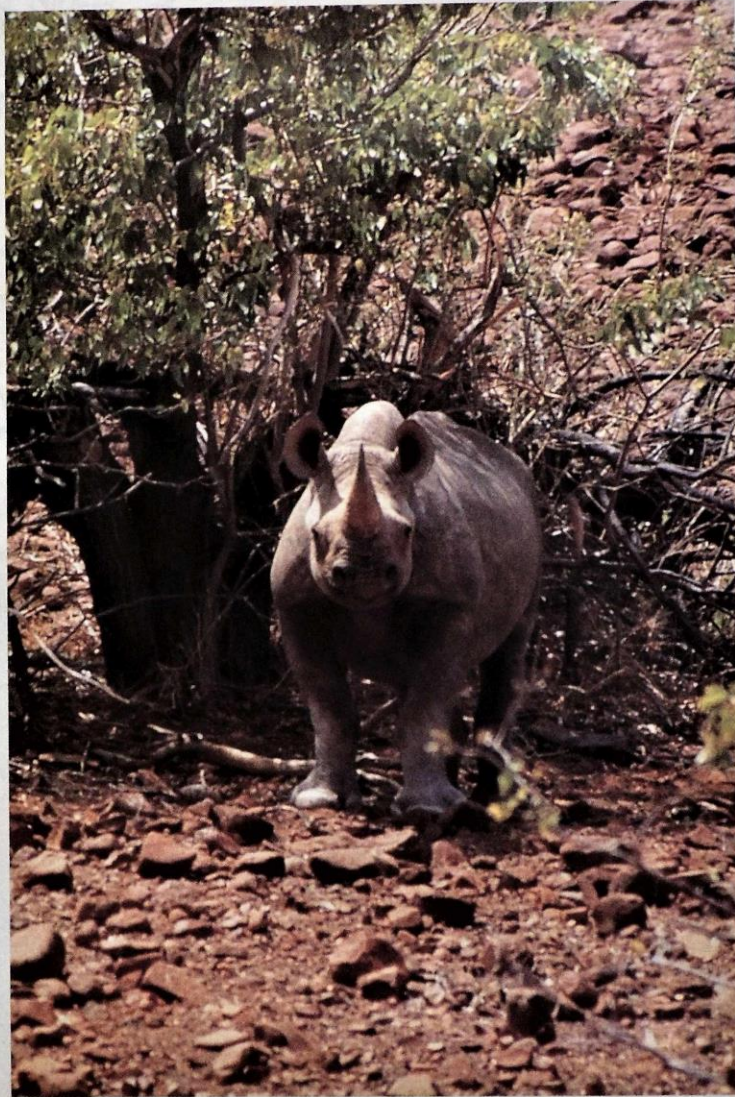
Tenuous connection or complete fallacy?

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Black Rhino are today amongst the most rare and threatened of large terrestrial mammals. Their populations began to decline with European settlement and habitat loss, and have declined even more rapidly in recent times because of successful poaching for rhino horn. Conservation agencies have made every effort to conserve the species, even to relocating small breeding populations to more secure areas. One such place is the Western Plains Zoo in Dubbo in western New South Wales, Australia. Other sites are in better protected areas within southern Africa, such as the Waterberg in Namibia, near Kimberley in South Africa, and re-introductions to Mkuzi and Ndumo Game Reserves in KwaZulu-Natal. The relocation of the southern race of the White Rhino in the 1960s rescued this species from the very brink of extinction to a point where there is almost a surplus of these animals today. The White Rhino story is surely one of the conservation success stories of this century.

But what does all this conservation action have to do with plants?

For many years it has been known that Black Rhino occasionally exhibit a rather unusual "feeding frenzy". This unique behaviour occurs when individuals indulge in what only can be called "euphorbia binging", something that, when it happens, focuses their attention so acutely that some have been known to tumble to their death down small cliffs in their efforts to munch even more euphorbia. As plant ecologists we have always been intrigued by this compulsion that Black Rhino occasionally exhibit, especially when we know that the latex of euphorbias is incredibly toxic to humans, and even a fraction of a drop can cause blindness and excruciating pain. We know, too, that as a rule plants do not suffer death as a result of being eaten, but Black Rhino have been known to demolish an individual shrub to such a degree that it succumbs. Strangely enough, other euphorbias of the same species in the same locality remain untouched. It seems that once a



Young female Black Rhino under a mopane tree in Damaraland.

rhino begins to eat a specific plant, all its attention becomes totally focused on that plant, and some rhinos have been known to continue feasting for more than a day on a single plant. This is surely one of the strangest eating habits of any animal? In one of these feasts, up to 100 kilograms of fresh material may be consumed, the only respite being that the rhino may wander off to drink before returning to complete the meal. So what

is it that makes the euphorbia, notorious for the toxicity of its latex, so magnetic? No one really knows, but we have a theory that remains to be tested.

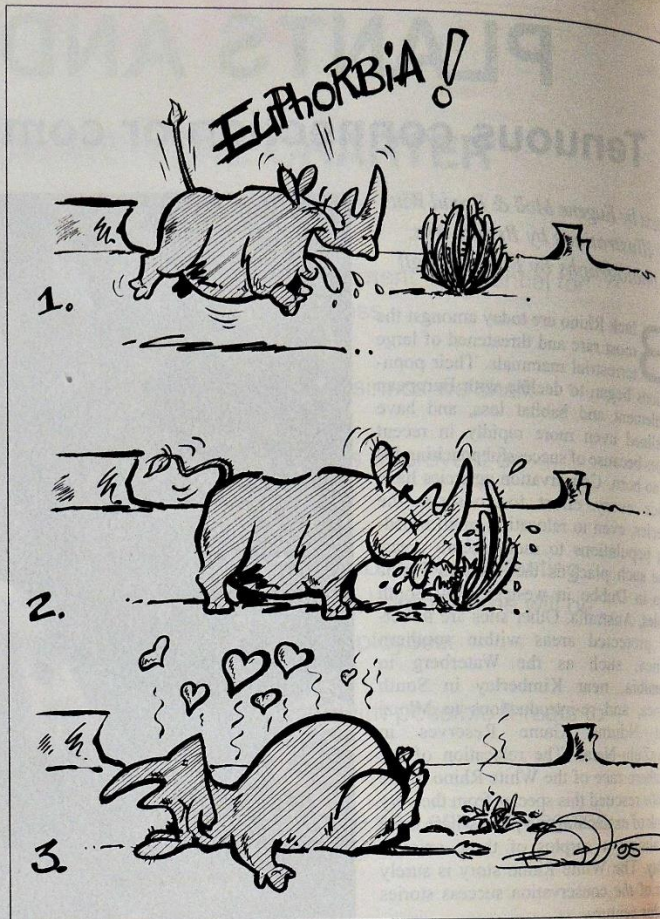
What is needed is some logical explanation for why Black Rhino have these occasional euphorbia binges. When going through the data, which are few and far between, it seems that adults of both sexes indulge themselves, and even juveniles have been observed with their

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noses well and truly in the euphorbia bush. The only scientific way to test the effect of the binge would be to analyse blood samples pre-binge and post-binge, and look for differences resulting from eating all that euphorbia. This is deemed an impossible task, as getting a blood sample is extremely difficult and certainly risky, and if the animal is tranquilised there is always the danger that it may not recover from the drug. Then there is the problem of replicating the experiment sufficiently often to get a statistically valid result – a virtually impossible task. So some other, possibly indirect, solution to the problem is required. A biochemist friend suggested that urine samples may do, but did you know that rhinos spray urinate! That means you should never stand behind a rhino with a full bladder unless you're wearing a full set of waterproofs. However, it would be possible to collect urine, as even urine-wetted soil would do. But we still have to convince those who have Black Rhino in captivity to run the feeding experiment.

So what is so special about the euphorbia? Well, before we tell you the significance of that, you should know that in the few places where Black Rhino still occur in greatly reduced numbers, their breeding capacity (or as zoologists like to call it, their "fecundity") is poor. Whether this is because ovulation is irregular or because impotency is rife, is unknown – but certainly Black Rhino could learn a lot from White Rhino which for size and bulk rival mice in the procreation stakes. Also you may need to consider that there is one place in southern Africa where the local Black Rhino population is pretty normal, since most females have calves with regular monotony. So it would seem that fecundity is not the problem, rather it is something that is missing from their habitat! We think that there is a connection between fecundity and euphorbia binges. We say this because where this "normal" population occurs, euphorbias abound – in some cases they are the only plants around in drier periods.

Before revealing all, we need to backtrack a little. The family Euphorbiaceae has a cosmopolitan distribution and a number of species have economic importance. One of the characteristics of the family is that individuals produce a latex that exudes from damaged parts of the plant. In the extremely large and diverse genus *Euphorbia* this latex is produced in copious quantities as a white, milky substance. People have attempted to use it commercially to make rubber, but with no success. However, the latex is known to contain



Black rhino occasionally exhibit a rather unusual "feeding frenzy" and indulge in what can only be called "euphorbia binging".

compounds that have pharmacological properties, so there has been a lot of research done on its composition. Some compounds that occur in large quantities are steroids. As we all know, steroids have achieved a level of notoriety since they are the substances athletes use to build speed, stamina and muscles. We also know that the hormones that control male and female sexuality and reproductive activity are steroids. So, the question is: can Black Rhino do without their aphrodisiacs, their euphorbia? Is it possible that these massive euphorbia meals actually substantially increase the steroids in the rhino to improve fecundity? Is this as stupid as it may seem? Well no! Ask your local vet and you will soon learn that it is well known that lucerne fodder, for example, is low in steroids while clover fodder is high. Better still, Blackshoulder Kites are known to be stimulated to breed aseasonally when their food supply, mice, are fat and ready

to breed. Fat mice are full of steroids. The steroids in the mice increase the steroids in the kites, so when the eggs hatch the mice populations have exploded and there is ample accessible food for hungry nestlings. So maybe it is just possible that the massive euphorbia feasts are important to boost steroids in Black Rhino – in the males for testosterone, in females for progesterone and oestrogen (for lactation or ovulation), and in juveniles to push them over the line to "puberty". Maybe it's not so silly, and there is circumstantial evidence that in Etosha, Namibia, the east and west populations have differing fecundity, and that the more fecund population has ready access to a plentiful supply of euphorbia, then the theory becomes more believable. More believable, too, when it is known that the translocated Waterberg population in Namibia has not been performing too well in the procreation stakes. And you may well have

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guessed it – the Waterberg is not rich in euphorbias. The Dubbo Zoo population is not breeding on lucerne. Maybe some clover or even some “exotic” euphorbia is needed. Do we really know? But more importantly, can we afford not to know? Maybe those in a position to do something may find my theory worth testing. After all, athletes’ urine is now regularly checked for the presence of steroids. Why not rhino urine?

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Their attention can be focused on euphorbias so acutely that some have been known to tumble down small cliffs to their deaths ...

