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Deon Furstenburg

Plains Zebra

Equus quagga (Boddaert, 1785)

Afrikaans	Vlakte sebra / Bont sebra
German	Steppenzebra
French	Zèbra de Burchell
isiNdebele	Idube elibhondo
isiZulu	Idube
isiXhosa	Iqwarhashe
seSotho	Pitse ya naga
seTswana	Pitse yanaga
Shangaan	Mangwa
Nama	!Goreb
Lozi	Pizi

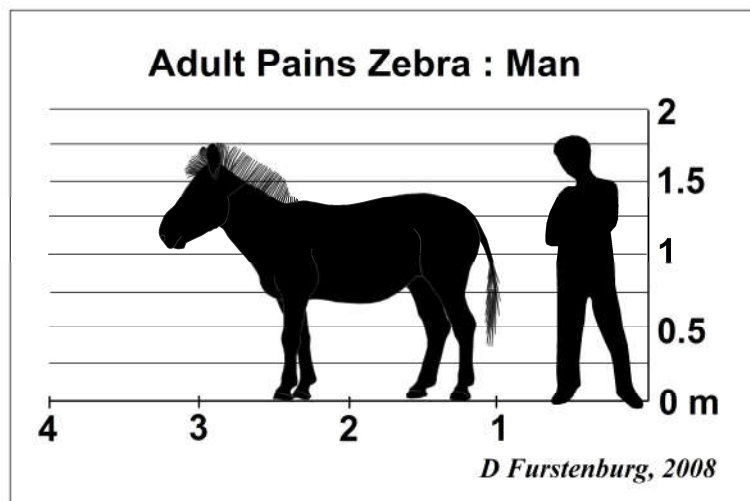


Photo: D. Furstenburg, adult Chapman's Plains Zebra

IUCN Conservation Status:

Gevy's zebra, Crawshay's zebra = Endangered (EN);
 wild ass, Selous zebra = Critically Endangered (CR);
 Grant's zebra = Lower Risk, conservation dependent (LR/cd);
 Chapman's zebra = Lower Risk, least concern (LR/lc).

Children sometimes refer to this handsome animal as a "pyjama-donkey"! In the early 1800s it was known as the wild horse of Africa. The popular name of plains zebra refers to the animals' preference of plains environments, in contrast to its cousin the mountain zebra found in mountainous habitats. The now extinct quagga and the plains zebra were successfully tamed during the 1800s and cross-bred with donkeys to produce an animal to pull carts and wagons. Hybrids of this nature are called zeb-donks. It is difficult to spot zebra from an aircraft despite their apparently highly visible black and white stripes.

Taxonomy	Kingdom:	ANIMALIA
	Phylum:	CORDATA
	Class:	MAMMALIA
	Supercohort:	LAURASIATHERIA
	Cohort:	FERUNGULATA
	Superorder:	PARAXONIA
	Order:	PERRISSODACTYLA
	Family:	Equidae
	Genus:	<i>Equus</i>
	Species:	<i>quagga</i>

The genus includes zebras, horses and the wild ass, with the following African species being recently defined

- *Equus africanus* the wild ass of north-eastern Africa
- *E. zebra* the mountain zebra of south-western Africa
- *E. grevyi* Grevy's zebra of north-eastern Africa
- *E. mauritanicus* the extinct North African zebra of the Sahel
- *E. quagga* the plains zebra with six subspecies
 - *E.q. boehmi (granti)* Grant's zebra of central and eastern Africa
 - *E.q. crawshayi* Crawshay's zebra of eastern Africa
 - *E.q. selousi* Selous zebra of south-eastern Africa
 - *E.q. antiquorum (chapmani)* Chapman's zebra of southern Africa
 - *E.q. burchellii*, the extinct Burchell's zebra of Namibia, Botswana and the northern Cape region. The last member of this subspecies died in 1918
 - *E.q. quagga* the extinct Cape quagga of South Africa, the last member dying in 1883

Considerable confusion exists over the recent name changes of the zebra species. Despite major doubts regarding specie-specific relationships, the mountain zebra *E. zebra* is not obviously related to any of the plains zebra's sub-species. The mountain zebra and the African wild ass evolved from an unidentified ancestor during the early Pleistocene 1-2 million years BP. Grevy's zebra developed from a different pre-ancestor *Equus capensis* during the middle Pleistocene, in a time prior to development of the plains zebra. A comparison of the morphology and coat colouration indicated that Grevy's zebra and the mountain zebra might share a common pre-ancestry. This was confirmed by mitochondrial DNA analysis. The sub-species of the plains zebra which includes the quagga and Burchell's zebra, evolved 120 000-290 000 years BP in the middle of the penultimate glacial maximum and shared a common ancestor in *E. mauritanicus*. The latter was a much larger animal found in North Africa during the late Pleistocene.

The extinct quagga was the youngest member of the plains zebra. It was hunted to extinction between 1850 and 1870, the last three individuals dying in 1872, 1878 and 1883 in the zoos of London, Berlin and Amsterdam respectively. The last remains of the quagga are 18 full animal mounts, one shoulder mount, three skeletons and seven skulls. The last Burchell's zebra in nature died in 1910 and the last in captivity, in 1918 in the Berlin Zoo.

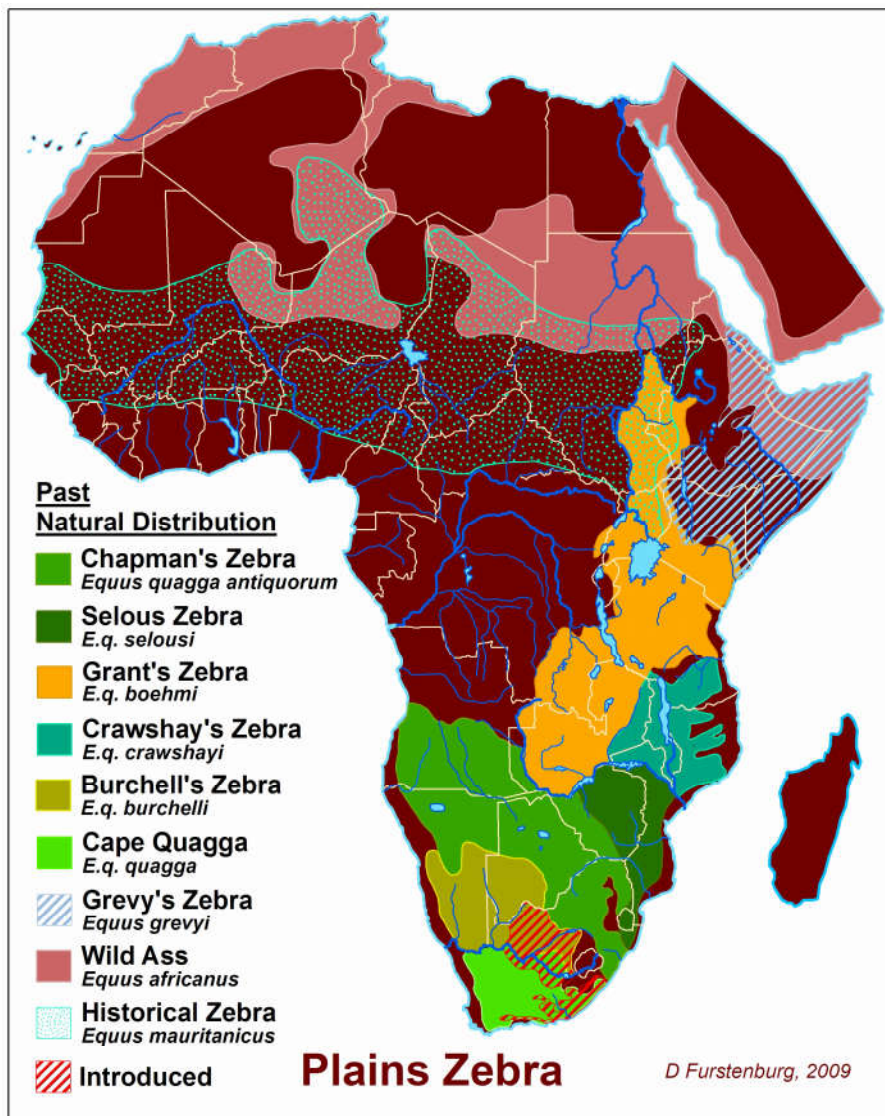
A collaboration between the SA Museum in Cape Town and a research team led by the German taxidermist Reinhold Rau, established the Quagga Project in 1986 in an attempt to restore the extinct quagga. By 2000 they had succeeded in regaining the external colouration of the extinct Burchell's zebra.

Distribution

The quagga was restricted to an area south of the Orange River in the former Cape Province. It was also found in the southern Free State and the western parts of Lesotho. Burchell's zebra was confined to southern Namibia, the Kalahari, the former Cape Province north of the Orange River and the north-western Free State. In the past, the distribution of Chapman's zebra formed a belt stretching from southern Angola and northern Namibia through Botswana to KwaZulu-Natal. The Selous zebra was found in southern and central Mozambique and in north-eastern Zimbabwe. Crawshay's zebra was restricted to an area stretching from northern Mozambique through to the Luangwa Valley in Zambia. The distribution of Grant's zebra has remained relatively unchanged and follows the eastern tropics from western Zambia through to south-eastern Sudan, while Grevy's zebra is associated with the arid regions of northern Kenya, Somali and eastern Ethiopia.

The plains zebra presently being introduced into South Africa are predominantly the Chapman's zebra and not the Burchell's zebra as reported in the majority of available

literature and media. Some South African zebra populations also bear traces of the Selous zebra's colouration which gives rise to dispute over their genetic purity.



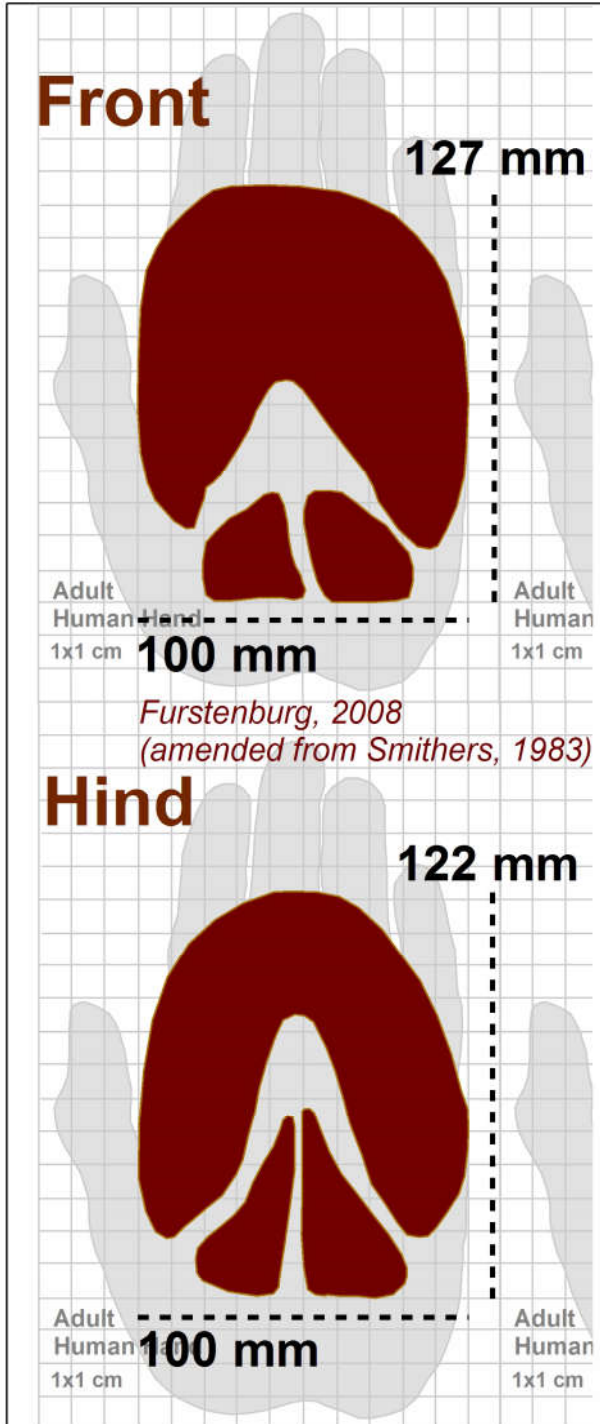
Description

The most descriptive differences between the zebras are given in the following table:

Descriptive differences between the zebras					
Species	Size Mass / Height at shoulder	Black stripes			Dew- lip
		Body	Legs	Belly	
Mountain	Cape:	Narrow stripes, close to one another, ending in a horizontal line, two thirds	Full length is	None	20x8

zebra	230-255 kg 125 cm Hartman: 275>300 kg 150 cm	down the flanks. No shadow stripes. Orange-brown shade on the muzzle above the nose.	covered with horizontal rings		cm
Grevy's zebra	350–450 kg 145–160 cm	Narrow stripes, close to one other, ending in a horizontal straight line, two thirds down the flanks. No shadow stripes. A tenuous dark extension of the mane stretching down to the tail.	Full length is covered with horizontal rings	None	15x3 cm
Crawshay's plains zebra	280–315 kg 130 cm	Narrow stripes, close to one other, extend down the flanks and around the belly. No shadow stripes.	Full length is covered with horizontal rings	Striped	None
Grant's plains zebra	280–315 kg 130 cm	Very wide stripes far apart, extend down the flanks and around the belly. No shadow stripes.	Full length is covered with horizontal rings	Striped	None
Selous plains zebra	300 kg 150 cm	Very wide stripes far apart, extend down the flanks and around the belly. Shadow stripes on most of the body except for the neck and face.	Full length is covered with horizontal rings Stripes are faded.	Striped	None
Chapman's plains zebra	290□340 kg 130□136 cm	Wide stripes far apart, extend down the flanks and only some of the stripes stretch around the belly. Shadow stripes on most of the body except for the neck and face.	Upper half of leg is covered with horizontal stripes that go halfway around the legs. Stripes are faded.	Partly striped	None
Burchell's plains zebra	290□340 kg 130□136 cm	Wide stripes far apart, end halfway down the flanks. Stripes are faded towards the ends. Shadow stripes on the back and the flanks. No stripes on lower half of buttocks and shoulder.	No stripes	None	None
Quagga	125□135 cm	Very wide stripes, close to each other and ending halfway down the flanks. Stripes fading towards the ends Stripes change in colour from black to brown towards the hind-quarters. No shadow stripes and no stripes on lower half of buttocks and shoulder. Upper parts of body have a red-brown tone.	No stripes	None	None

The zebra has only one toe in each foot and thus the spoor is a single, three-quarter circular print. It is rounded in front and square at the back with a V shaped wedge in the centre. The front and hind spoor are almost equal in size measuring 12.5x10 cm.



Information table

Chapman's Plains Zebra information table			
Characteristic		Stallion	Mare
Adult body weight	kg	290 – 340	290 – 340
Adult shoulder height	cm	130 – 138	130 - 138
Sexual maturity age	months	36	16 – 20
Social maturity age (1st mating)	years	5	2 - 2,5
Gestation period	months		12,5
1st Foal born at age	years		3
Foal interval	months		16
Rutting season		Year round	
Birth season			Year round
Weaning age	months	9 – 14	
Gender ratio: entire population (natural)		1	1,5
Gender ratio: entire population (production)		1	4
Mating ratio: adults (natural)		1	4
Mating ratio: adults (production)		1	6
Foal birth ratio		1	1
Maximum lifespan	years	22	22
Home range	km ²	100 – 260	100 – 260
Territory range	ha	None	None
Large stock grazing unit (adult)	LSU	0,7 per animal (95% of diet)	0,7 per animal (95% of diet)
Browsing unit (adult)	BU	2,2 per animal (5% of diet)	2,2 per animal (5% of diet)
Maximum stocking load		25 ha per animal (at 450 – 550 mm rain)	
Minimum habitat size required	ha	800	
Annual population growth		15 – 29%	

Trophy

Zebra do not have trophy status as they lack horns. Despite this, the hides are a highly priced curio for both the hunter and the tourist market.

Plains Zebra trophy records	
	Rowland Ward (XXVII edition 2006)
Not listed as a trophy animal	
	Safari Club International S.C.I.
Not listed as a trophy animal	

Habitat requirement

In general, the plains zebra is a savannah animal with a preference for open woodland or broken bushveld with ample stands of a large variety of vigorous, medium height grasses in both sweetveld and mixedveld. Zebra prefer sweetveld on plains with basalt and turf soils and a mean annual rainfall of 380–550 mm. Plains zebra adapt readily to a large range of marginal habitats including the Thicket Biome up to the snow-line and temperate tall grasslands, but family groups tend to be much smaller in these habitats. Groups are also found in the marginal, eastern granite sandveld of the Kruger National Park in mixedveld with grass stands of up to 150 cm. Plains zebra do not flourish in arid environments, forests and sourveld habitats and avoid steep and rocky slopes.

Behaviour

Plains zebra are diurnal and are mostly active in the cooler daylight hours of dawn and dusk. During the hot midday hours they congregate in the shade of a tree and often lie down with the head flat on the ground for periods of 15-30 minutes.

The strong hierarchy of dominance among mares in family groups is established by fighting. These fights usually take the form of a series of bites, with kicking and slashing of both fore and hind hooves. Foals often die from the fierce attacks of superior mares in the group. A zebra kicks backwards with both hind feet simultaneously and the result is considerably more damaging than that of a domesticated horse. When capturing zebra or handling injured animals extreme care must be taken by the handlers in order to avoid fatal injury. Stallions should be crated individually and members of different family groups should not be mixed as it is likely to provoke serious conflict.

High-ranking mares have priority in accessing dust baths, shade, drinking and other limited resources. Friendly encounters between family members include grooming of the head, neck and shoulders by a gentle nibbling. Vocalizing consists of harsh snorts, a barking “kwa-ha-ha” as an alarm signal and a soft lip smacking of contentment or short-range contact call.

Plains zebra are known for their association with other gregarious animals such as the blue wildebeest *Connochaetes taurinus*, impala *Aepyceros melampus*, waterbuck *Kobus ellipsiprymnus*, giraffe *Giraffa camelopardalis*, warthog *Phacochoerus africanus* and the Chacma baboon *Pappio ursinus*. Such associations allow the different species to share their ability to detect danger. Plains zebra keep to a safe distance of 30-80 m from danger. When alerted, the herd bunches and takes flight in single file led by the mare with the weakest or youngest foal. Foals stay with their mothers while the stallion takes a defensive rearguard position from where he can kick or bite pursuers. In flight they run for a distance of 0.5-3 km at 60-70 km/hour before stopping for the first time. Studies in the Kruger National Park have shown that twice as many stallions are killed by lion than mares due to their rearguard position.

Feeding & Nutrition

The zebra is classed as a non-selective, bulk feeder of intermediate to tall grass of 6-35 cm. The diet consists of 92% grass and 8% dicot forbs and includes large volumes of coarse fodder such as grass stems and plumes. More than 50 grass species in the diet have been recorded in the Kruger National Park. The most preferred grasses are red grass *Themeda triandra*, couch grass *Cynodon dactylon*, turpentine grass *Cymbopogon plurinodes*, assegai grass *Heteropogon contortus*, common bristle grasses of the *Setaria* sp, bottlebrush grass *Enneapogon scoparius* and finger grass *Digitaria eriantha*. Young

leaves and growth ends of woody plants are nibbled sporadically but contribute little to the overall dietary intake. Underground bulbs and roots are dug up with the forefeet during droughts.

Seasonal movement in search of nutritious grazing with a high crude protein content often results in migration and is a critical form of survival behaviour. Zebra migrations often follow blue wildebeest treks and are usually induced by veld fires that give rise to new growth. Zebra are generally the first animal species to occupy burnt veld.

Zebra are in direct competition with red hartebeest *Alcelaphus buselaphus* as they both occupy the same feeding niche. Stocking with too many short grass grazers such as springbok *Antidorcas marsupialis*, wildebeest and blesbuck *Damaliscus pygargus* can be detrimental, as they shorten the grass layer and make it unsuitable for zebra. Zebra are monogastric animals and do not ruminate. They frequently seek mineral-rich ground licks and will take supplementary artificial licks, but caution should be exercised as their high levels of urea can kill a zebra.

Zebra have little impact on veld condition compared to most other grazing animals. This is because, unlike most antelope, the zebra has a fully operational upper set of incisors that can bite off plant material more efficiently at ground level without uprooting the plant. Antelope are more destructive as they lack upper incisors and usually rip out the entire plant.

While most antelope drink during the cooler daylight hours, plains zebra drink during the hotter midday hours. The availability of clean, daily drinking water is essential. They dig seepage pools on the sides of pools if the water source is muddy or dirty. In times of drought seepage pools are dug in dry river beds. Plains zebra are seldom found further than 8 km from a water source.

Territory & Home range

Plains zebra are migratory by nature and move between food and water sources. As a result, home ranges are large, unstable and temporary, varying in size from 10 000–26 000 ha. The size can be reduced to 2 500 ha by a fire management programme that provides optimal feeding throughout the year. In the Eastern Cape Valley Bushveld that has an annual rainfall of >400 mm, plains zebra thrive on game farms as small as 800 ha. Smaller home ranges of 2 500 ha can only support groups of 50–80 zebra and 800 ha, 4–6 zebra. Large aggregations of multiple family groups can form herds of over a thousand. This was common in the past and was seen in the Serengeti until the 1970's after which time the numbers of zebra declined drastically. In the Etosha Pan of Namibia, multiple groups of up to 600 Chapman's plains zebra still form sporadically. During migrations, individuals of family groups follow each other in single files which then follow other family columns. When this happens, long dust lines of moving plains zebra can be

seen from a distance, especially from an aircraft. The annual migration of both Chapman's plains zebra and blue wildebeest in the Kruger National Park covers a round trip distance of approximately 420 km.

Dominant stallions do not display territorial behaviour but rather associate with a family group and accompanies their movements.

Social structure

Plains zebra are gregarious and form large herds of multiple, closed family groups consisting of 4-12 individuals. These herds move through the home range as a temporary unit. An identical social phenomenon is found in herds of the African buffalo *Syncerus caffer*. In thicker woodland or bushveld and on smaller land-units, the larger aggregations are lost and independent family groups are scattered across the habitat.

Family bonding within family groups is very tight and permanent and follows a strict hierarchal order of dominance. A family structure consists of a dominant stallion of 8-12 years, a dominant alpha mare aged >8 years, 2-3 beta mares of 5-8 years, 2-5 mares of 3-5 years and several sub-adults of both sexes <3 years old. Bodily contact is frequent as they rub against each other and groom with their teeth.

Young stallions leave the family group at three years and join bachelor groups that keep to the periphery of the large herds and utilize the same home range. In natural populations, bachelor groups form 15% of the total animal number.

Young mares become socially mature at 2.5 years and some are lured away from the family group by opportunistic non-dominant stallions. Often these mares do not return to their mother group but establish new families of their own.

When a stallion associated with a family group loses its dominance, it is replaced by a new stallion that forcefully expels the young males that are not his own progeny. Lactating mares stop suckling their foals and immediately recommence oestrous for the new stallion. Foals that continue to suckle are often kicked to death by the stallion. Many unweaned foals too weak to survive either starve to death or fall prey to predators.

Reproduction

Mating occurs throughout the year. The gestation period is 12.5 months and 85% of the foals are born between October and March. This wide spread of the birthing period results in high foal mortalities in areas where there are large predators. Mares do not go into isolation for birth but remain within the group. After 50-60 minutes the foal has gained sufficient strength to follow its mother and moves with the group. The mother does not eat the afterbirth. Twins are unknown and mares with newborn foals are

aggressive. Foals begin to graze when they are seven days old and, until an age of 3.5 months, eat the dung of adults to build up the digestive microbes in the rumen. They wean at 9-14 months depending on the environmental conditions and the social order of the family group. Foals that are separated from their mothers run the risk of being kicked to death by older mares.

Stallions reach sexual maturity at three years, social maturity after five and physical dominance after eight. They begin to mate with young breakaway mares at an age of five but only mate with superior family mares after they are eight years old. Mares become sexually mature at 16-20 months and mate from an age of 2.5 years to the end of their lifespan. A dominant stallion will mate successfully with up to six mares in the group and becomes infertile and post mature after 12 years.

Production

Between 60 and 80% of the foals <12 months old fall prey to large predators. The adult size is reached at 3 years and the adult mass after 5 years. The optimum age for harvesting is 5-8 years and for live sales 3-5 years. At 15-17 years the hollows on the cutting edge of the incisors are completely worn away, indicating the beginning of the last phase of the zebra's lifespan. Once the incisors have worn down to the gums the zebra loses its ability to forage and usually starves to death. The maximum lifespan is 22 years and the natural annual population growth varies from 15-29% depending on veld condition, predation pressure and the social interactions within the population.

An adult Chapman's plains zebra animal unit equals 0.7 Large Stock Units (LSU) and 2.2 Browser Units (BU). To estimate the stocking load the LSU should be corrected to 95% grazing and the BU to 5% browsing. This computes to 0.67 LSU and 0.11 BU per zebra. A minimum of 25 ha optimal habitat with an annual rainfall of 400-550 mm per zebra supplies the required variety and quantity of its annual diet. This area must be enlarged by 5.5 ha/zebra/100 mm decrease in rainfall and minimized by 1 ha/zebra/50 mm increase in rainfall up to a maximum of 800 mm. The minimum area for plains zebra is 800 ha. Smaller areas require intensive management.

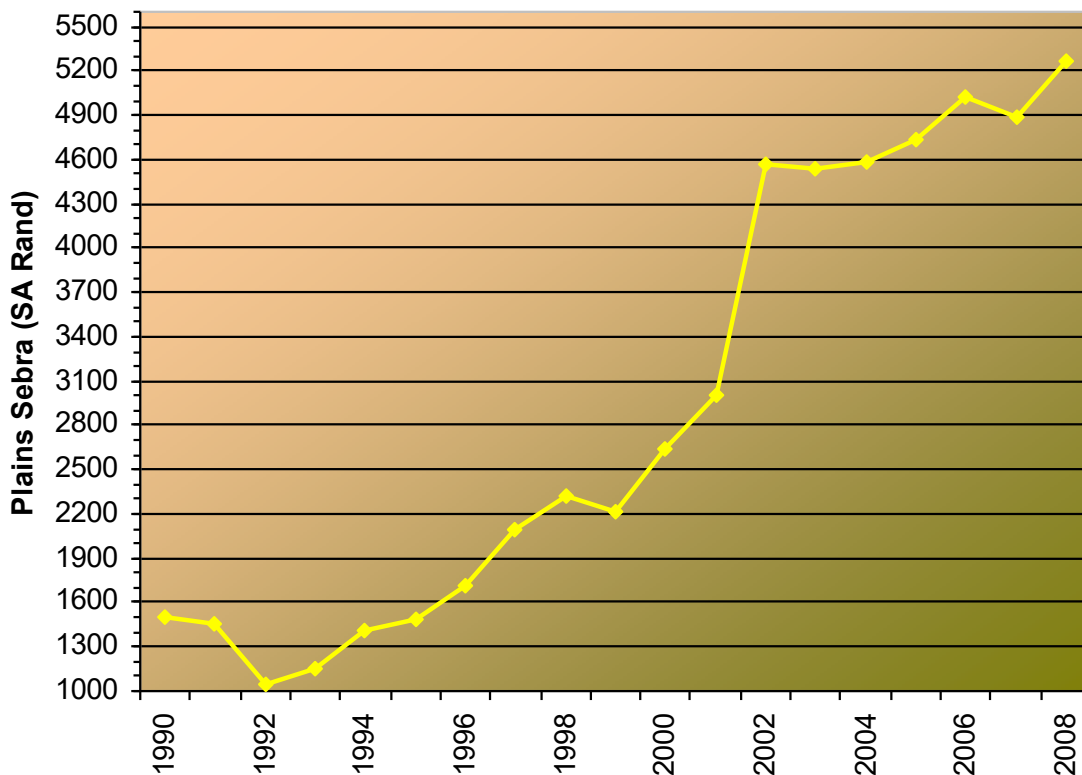
Diseases

Plains zebra are generally resistant to tropical diseases except for horse-sickness, which can eliminate entire populations. They tolerate high infections of ticks and are not susceptible to foot-and-mouth disease or malignant catarrhal fever.

Average growth formation of the Chapman's Plains Zebra		
Age	Body Mass (kg)	Shoulder Height (cm)
Birth	30 – 40	55
3 years	180 – 220	126 – 130
5 years	260 – 330	128 – 136
8 years	280 – 360	130 – 136
20 years	280 – 360	130 – 136
Maximum mass recorded in the Kruger National Park = 429.4 kg		

Trend in mean annual Plains Sebra prices

(Data from: Vleissentraal; T. Eloff, Univ. Potchefstroom; Cloete & Taljaard, Univ. Free State)



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Gallery



Photo: Johan vd Vyver, adult Chapman's Plains Zebra



Photo: Deon Furstenburg, adult Chapman's Plains Zebra

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