



KREB

*“If the grasshopper
harvests,
the ant will pay
the debt.”*

[African proverb]

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THE NIGER PHOTO: COURTESY OF N. SCHABERKA



KREB HAS BEEN THE STAPLE FOOD OF NOMADS AND THEIR HERDS FOR CENTURIES

INTRODUCTION

Kreb is the name given to the mixtures of grains from a dozen or more of the wild grass species that grow in the semi-arid environments of the Lake Chad Basin and the whole of sub-Saharan Africa; these are harvested to produce food for humans and feed for animals. The mixture may vary from place to place and from year to year, according to the species of grasses that are available.

Kreb used to be the traditional cereal source for pastoralists, who would protect grasslands to ensure seed production, harvest the grains and then allow their animals to graze the grasslands. In this

way, agriculture and pastoralism were combined in a productive system that was well adapted to the fragile ecosystem of the area.

However, the immense potential of *kreb* has been sorely neglected in recent years as populations have been encouraged to discard it in favour of cultivated crops and specialized agricultural and pastoral production. There is now a real danger that this once-prized foodstuff will be lost forever as oral traditions of how to harvest and prepare it die out. There are already signs that the use of *kreb* is becoming more and more sporadic.

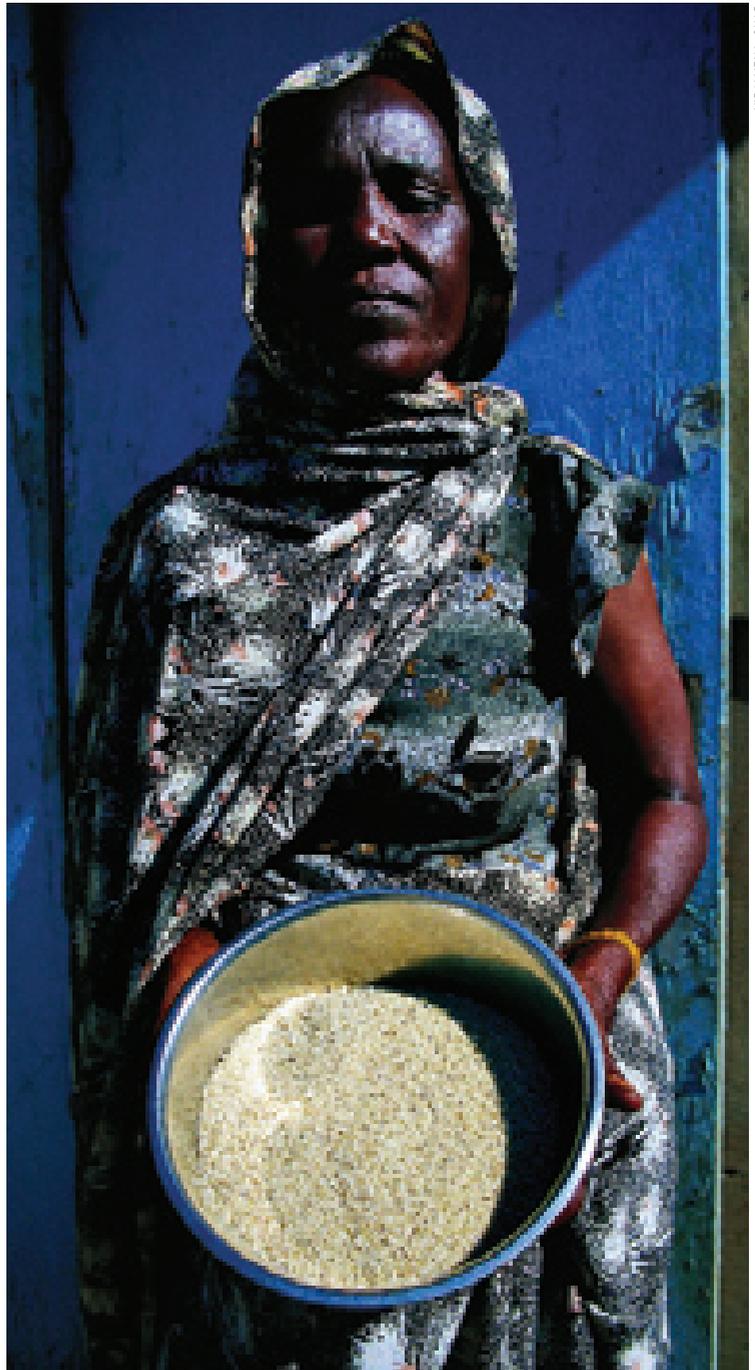
HISTORY

A NOBLE PAST

Derisively dismissed in recent times as “famine food”, *kreb* has, in fact, been a staple food for centuries in much of the Sahel and other parts of sub-Saharan Africa. It was traditionally harvested from natural grasslands by nomadic herders for their own consumption and was highly relished for its culinary merits ^{(4,11)(4,2)}. There is evidence of traditional pastoral grassland management systems that promoted the production of *kreb* and grass. Under herding and nomadic grazing systems, chieftain elders used to forbid grazing in certain pastures in order to allow the plants to seed. If camels were found grazing in the forbidden area, the chief pastoralist could demand a camel in compensation. If any goats were found in these areas, ten goats could be claimed in compensation for the loss of grain.



ERAGROSTIS TREMULA [PLATE 4]



NDJAMENA, CHAD

KREB, A MIXTURE OF GRAINS FROM WILD GRASSES, IS STILL USED AS HUMAN FOOD



KREB IS IN DANGER OF OBLIVION BECAUSE THE NUMBER OF PEOPLE COLLECTING IT IS DIMINISHING AND THEIR TRADITIONAL KNOWLEDGE IS BEING LOST

REASONS FOR THE DEMISE OF *KREB*

With the advent of the colonial powers came prejudice and the introduction of new types of crops. As a result, the huge potential of wild grasses was largely ignored. Moreover, a combination of decreased nomadic movements and local conflicts has reduced access to available *kreb* sources in remote areas. Also, continuous grazing around villages and water points has resulted in grassland degradation, leading to the disappearance

of species suitable for *kreb* collection, because wild fodder plants cannot complete their life cycle and produce seed under conditions of continuous grazing.

Also contributing to the recent decline in the use of *kreb* is the fact that nomadism itself is on the wane. In the past, the two have always gone hand in hand, but the sedentary lifestyle being adopted by an increasing number of people encourages the replacement of *kreb* collection with cropping of introduced cereals^[4,3].



BALATUNGUR (BOSSO), THE NIGER

BENEFITS

A BOON TO FOOD SECURITY

Kreb is an extraordinarily versatile food source, making it a particularly valuable tool in the struggle for food security. There is no hard-and-fast rule as to what goes into *kreb*: its composition varies widely according to what is available at a particular time and in a particular region. In the Sahel, the grains of *Cenchrus biflorus* (*cram cram*, or Sahelian sandbur) are widely used^[4.4]. In more humid regions, *kreb* is likely to consist of grain from between three and 15 different species, which can vary from year to year and from place to place, according to soil differences and climatic conditions.

History shows that the harvesting of *kreb* in the grasslands is one of the most sustainable and organized food production systems in the world. In the last century, a single household could harvest 1 000 kg of *kreb* per season. Similarly indisputable is the fact that the grains used in *kreb* are highly nutritious, comparing very favourably with many cultivated crops. Studies show that the percentage of protein found in these wild grasses is often higher than that found in farmed cereals, reaching levels of 17–21 percent^[4.3]. The grasses are also especially rich in amino acids, which are generally lacking in sorghum and other common staples.



CENCHRUS BIFLORUS^[PLATE 5]



KALGAMA ISLAND (BOU), CHAD

HARVESTING OF *KREB* IS ONE OF THE MOST SUSTAINABLE AND ORGANIZED FOOD PRODUCTION SYSTEMS IN THE SAHEL



THE NIGER

PHOTO: COURTESY OF NSCHARENA

NOMADS AGREE THAT SOME AREAS SHOULD BE PROTECTED FROM GRAZING SO THAT GRASSES CAN PRODUCE SEED FOR *KREB* HARVESTING

A SAFEGUARD FOR THE ENVIRONMENT

As well as providing food and forage, the wild grasses used to make *kreb* play a significant role in protecting the environment. Perennial grasses anchor the soil, protecting it from wind erosion, and facilitate the infiltration of water, improving fertility and reducing runoff. Food security aside, there is a sound argument for returning to the practice of harvesting these wild grasses because of their potential contribution to halting desertification caused by overgrazing. *Kreb* grasses grow with no external input and form a stable and cheap barrier against desertification.



THE NIGER

PHOTO: COURTESY OF NSCHARENA

KREB SPECIES ARE AN IMPORTANT GENETIC RESOURCE THAT SHOULD BE MAINTAINED. THEY ARE RESISTANT TO DROUGHT, THRIVE IN WATERLOGGED AREAS AND SALINE SOILS, ANCHOR THE SOIL AND FACILITATE INFILTRATION OF WATER



THE WELL NEAR KABELWA VILLAGE (N'DOUÏ) THE NIGER

PASTORALISTS ARE THE CUSTODIANS OF *KREB* AND GRASSLANDS GENETIC RESOURCES

A VALUABLE GENETIC RESOURCE

The grass species used to make *kreb* are an invaluable genetic asset because their genetic make-up is closely linked to the particularly harsh conditions in which they thrive. Whereas the annual grasses harvested for *kreb* produce large quantities of grain and grow quickly during the rains, perennial grasses have a longer life cycle in order to ensure the reproduction of their

species under difficult conditions. The additional solar energy used by many Sahelian grasses, classified as C4,¹ produces a good grain yield. Such wild grasses can grow and produce grain in arid situations, in the presence of grain-eating birds (such as *Quelea quelea*) or hungry insects, on poor and sandy soils, and in waterlogged environments, i.e. in circumstances that would render the cultivation of other cereals impossible^[4,3].

The species used for *kreb* also have an international value as a genetic resource. Some are related to species used as food and forage crops. Therefore the genes that enable these wild grasses to resist heat, drought and disease, and to grow on shifting sands or saline soils, may be of use in the development of superior varieties of cultivated crops.

¹ C4 is a type of photosynthesis, technically known as the C4 carbon fixation pathway, which is especially efficient at high temperatures and in bright sunlight

A POTENTIAL MARKET RESOURCE

Although *kreb* is mainly harvested for household consumption, a proportion is sold on local markets. While visiting various marketplaces in Chad, the authors noted that its price varies from half the price of wheat to the same or double the price of millet, or even more, depending on the time of year, the price of other cereals and the proximity of large cities (prices are much higher in markets close to large cities). In monetary terms a 100 kg sack will fetch between 15 000 and 80 000 CFAF *.

This would confirm that there is a genuine market for *kreb*, and that there is an interesting potential to develop it further: as a replacement for other cereals and as a delicacy, to be sold as a “niche” product to the peoples who use *kreb* in their traditional recipes.

HARVESTING AND PROCESSING

The gathering of wild grass seeds and their preparation as food are processes that have changed little over the centuries. In the dry season, whole families, mostly women, harvest the wild edible grains from grasses to make *kreb*. Sometimes these grains are the only nutritious cereal available. When there is plenty of choice, larger grains are favoured, but the harvest is never selective because the different grasses grow alongside each other.

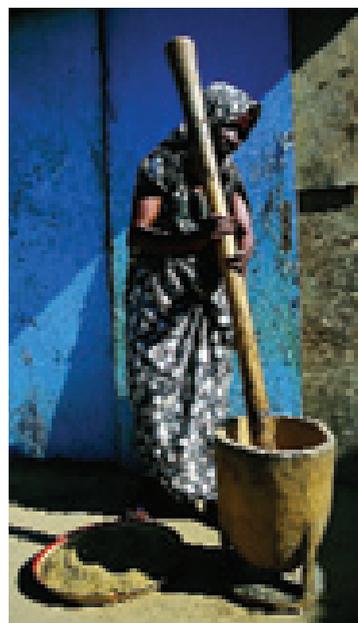
The most common device used for collecting the grain is a basket, known in Chad as a *sossal*. Conical in shape, it is made of sliced and woven dum palm leaves, with its pointed end pushed in to form a “navel” at the bottom. The wooden rim has a rope handle and the basket has a lid like a spider’s web to stop the chaff and leaves

from falling into the basket with the grain. When the seeds are ripe and ready to drop, the basket is swept through the grasses. As the basket fills up, the seeds are poured into a sack, which is carried by the harvester. The grain is then laid out to dry on dum palm mats before being eaten, either whole or pounded into flour, cooked or raw, depending on the type of grains forming the *kreb* ^[4,5].

While the grasses are still damp, they are scythed, dried, threshed and winnowed like a cultivated cereal. This leaves a stubble on which cattle or small ruminants can briefly graze. Sometimes when the seeds have already ripened and fallen, the grasses are cut or burned and the grain is swept up. This spoils the taste and allows sand and grit to become mixed with the seeds, which is a disadvantage, but still a viable option in hard times. Occasionally, in periods of severe drought, the women dig out seeds from ant hills or termite mounds, raiding the underground storehouses of these insects.

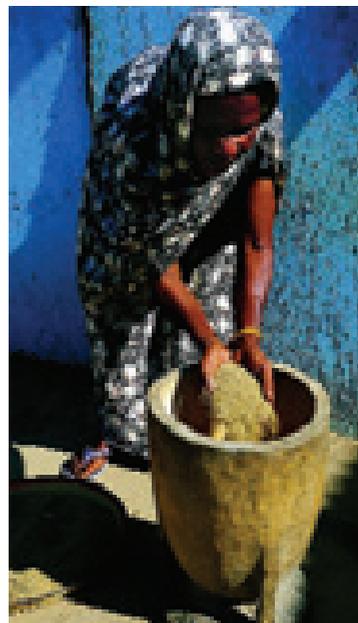


N'DJAMENA, CHAD



N'DJAMENA, CHAD

KREB IS MAINLY COLLECTED FOR DOMESTIC CONSUMPTION BUT IS INCREASINGLY SOLD IN MARKETS, ESPECIALLY AROUND LARGE CITIES



N'DJAMENA, CHAD

A SINGLE HOUSEHOLD ONCE HARVESTED 1 000 KG OF *KREB* PER SEASON

* 1 000 CFAF are equivalent to 1,52 euros.

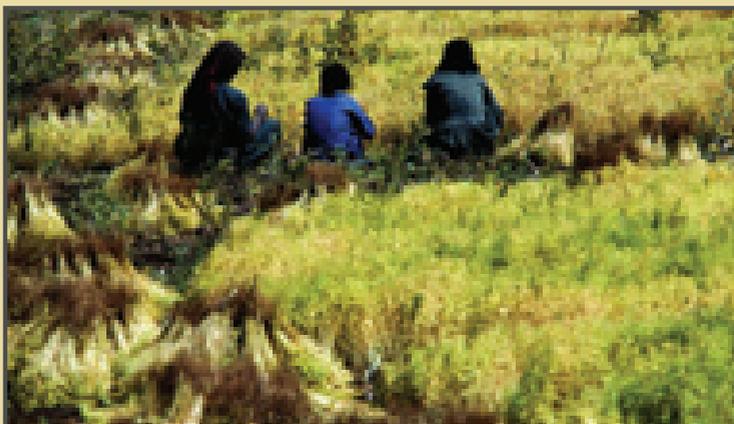


Tef and fonio: two examples of small cereal domestication

by **Alessandro Bozzini** *

In the semi-arid sub-Saharan areas, two species, with physiological and morphological features similar to the species involved in *kreb* harvesting, have been domesticated. These are tef (*Eragrostis tef* (Zucc.) Trotter), which is cultivated nearly exclusively in Ethiopia, and fonio (or *acha*) (*Digitaria exilis* Stapf.), which is cultivated in the dry savannahs of West Africa (Burkina Faso, Mali, Senegal, Guinea, Togo, Benin and Nigeria). Both have very small seeds and have been domesticated and cultivated as a staple food by the local populations for millennia.

Fonio is one of the oldest African cereal crops, along with sorghum, pearl and finger millets, African rice and tef. It is also considered to be one of the world's best-tasting cereals and one of the most



ARSII REGION, ETHIOPIA

TEF AND FONIO ARE AMONG THE OLDEST AFRICAN CEREAL CROPS

nutritious of all the grains, containing 8–11 percent protein, with a high content of essential amino acids (except lysine).

Fonio is cultivated in difficult soils (some 300 000 ha), and some cultivars or populations are very early: they can complete their cycle (seed to seed) in six to eight weeks. The grain is made

into porridge and *cuscus*, ground and mixed with other flours to make bread and pasta, and brewed for beer. The straw is used as animal feed and mixed with clay for making bricks.

Tef most probably derives from the wild *Eragrostis pilosa* (L.) Palib., which spread from Egypt into East Africa, into the Sudan and

* Professor of Genetics



WOLLO REGION, ETHIOPIA

TEF MOST PROBABLY DERIVES FROM THE WILD *ERAGROSTIS PILOSA*. TODAY IT IS THE MOST IMPORTANT STAPLE FOOD FOR ETHIOPIANS



TEF IS NOW CULTIVATED IN MANY PARTS OF THE WORLD AS A SOURCE OF GRAIN AND FORAGE

Ethiopia. Nowadays, tef cultivation covers about half (1.5 million ha) of the area devoted to cereals in Ethiopia and is certainly the most important staple for Ethiopians.

Tef flour makes a very particular type of bread, called *injera*, a kind of flat pancake, spongy, moist and elastic, produced after special fermentation and cooking. It contains no gluten and is therefore gaining the interest of people affected by coeliac disease (gluten intolerance). Several Ethiopian restaurants in the United States and Europe are now serving *injera*. Tef is also baked in cakes and used to prepare homemade beverages. The use of the straw mixed with clay, to make bricks for building, dates back to ancient Egypt.

The seed is white, red, brown or black and larger than the seed of its ancestral species (*E. pilosa*); the plant is also larger – a clear result of the domestication process, which includes resistance to seed shattering.

Tef grains are reported to contain 9–13 percent protein, have high digestibility and are well balanced in essential amino acids and several microelements. Therefore tef appears to be similar to wheat in food value. Recently, tef has also been cultivated in other areas (e.g. South Africa, India, the United States and Australia), both for grain and production of forage of good quality.



DIGITARIA EXILIS [PLATE 61]