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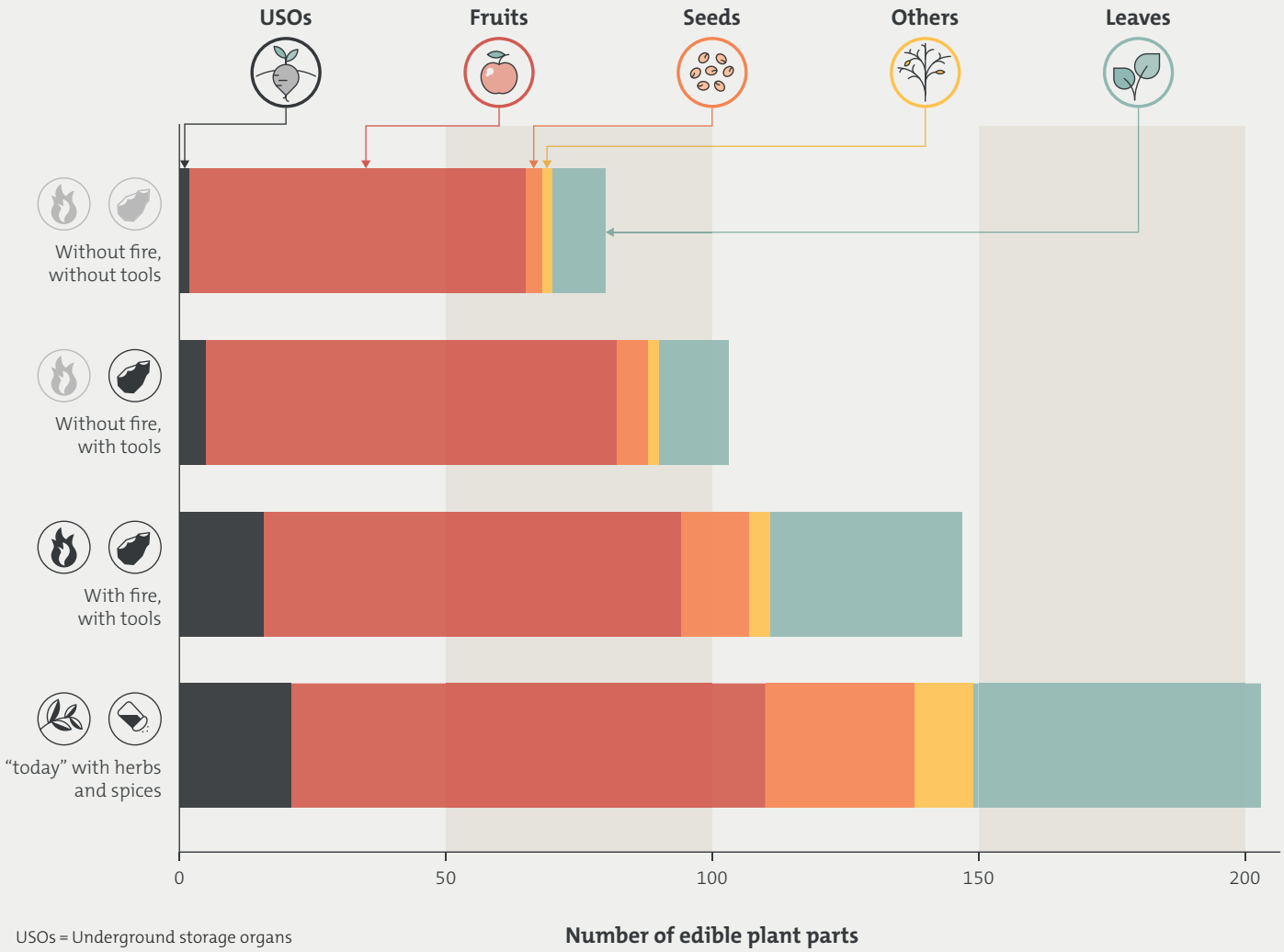
Raw or roasted? How fire changed what's on the menu

Wild plants have always played an important role in human nutrition. Although fossil remains of plants are rarely preserved in archeological contexts, it is undisputed that early humans also pursued a flexible and diverse nutritional strategy to meet their needs for energy and nutrients. This diet of meat and edible plant parts improved and became more effective throughout the course of human history through the use of fire and technological advances. At the beginning of human history, however, early humans did not use fire to process their food. Nevertheless, it can be assumed that early humans were able to implement simple methods of obtaining food such as peeling fruits or roots, cracking nuts, or digging for tubers and roots.

Fig. 2

To evaluate which vegetable food was available to early humans and what role fire played, we examined the edible wild plants that grow in the savannas of the *Cradle of Humankind* today as an example. Multiple paleoanthropological sites were documented in this area in the northeast of South Africa. Among other things, this region is known for the oldest remains of *Homo erectus* in southern Africa and the earliest evidence of human interaction with fire from Wonderwerk Cave, dated to one million years before present. Many of the edible wild plants available today were probably also available more than two million years ago and had the same nutritional properties as today. Plant species that are widespread in these savannas and could therefore represent an important source of food were of particular interest. We researched the edibility and known methods of preparation for the individual plant parts of the most important species. Only those parts of the plant were considered that were edible in large quantities and that could have been a relevant source of food for early humans. The edible parts of plants are very diverse and were grouped into five categories: Fruits, seeds, underground storage organs (roots, tubers, rhizomes), leaves (including stems, sprouts, flowers, buds), and "others" (here: sap, bark, wood).

1 Fruit from the baobab or monkey-bread tree *(Adansonia digitata).*



2 Number of edible plant parts available in the savanna in the *Cradle of Humankind,* South Africa depending on technological capabilities.

Fig. 2

Overall, there is an astonishingly wide range of plant-based food available in the South African savannas. Of 814 plant species, over 20 percent are described as edible, and many of these have multiple edible plant parts (see infobox on the baobab tree). More detailed information is available for 139 species, including 203 plants parts: even without any preparation, far more than half, namely 80 different parts of 74 plant species, are suitable for nutritional purposes. These include mainly fruits (63) and some leaves (10), which are available almost year-round in the mild South African climate. Many of the fruits are rich in vitamins and have a sweet, sugary pulp. They also have proteins and a higher fat content and are an important source of nutrition overall. With the help of stones or other tools, the menu can be extended to include over one hundred plant parts by the simplest means of preparation. This includes the removal of harder parts of plants by cracking as well as scraping and rubbing, which mainly accesses the starchy seeds and roots. Around half of all edible species documented in the region today can be prepared using these simple methods.

With the ability to control fire and use it to prepare food, the potential menu of humans expanded immensely. The number of edible plant parts now almost doubles, although here only plant parts are considered that can be made edible by simple cooking or roasting. Many starchy seeds and underground storage organs only become easily digestible through cooking or roasting and are therefore an important energy-rich source of food. This explains why, in the diagram, the proportion of edible underground storage organs tripled and that of seeds doubled with the availability of fire. Starchy storage organs in combination with fire, in particular, are assigned a significant role as a source of energy, because they also have the advantage of being available throughout the year, i.e., even during dry periods. The tubers of the wild potato *(Plectranthus esculentus)*, for example, can be eaten raw, roasted, or cooked and are very popular with the local population in South Africa today. But also the number of usable leaves and other plant parts that can be eaten as vegetables triples as soon as a fire is available as a form of food preparation.

All in all, mastering fire and using it for food preparation brought great advantages for nutrition—both in terms of the variety of edible plant parts as well as in terms of their exploitability. Many foods that can be eaten raw are easier to chew and easier to digest when cooked, and the nutrients they contain are better usable by the body.

Today's spectrum of species that are available for nutritional purposes is many times greater because the development of more complex processing and cooking techniques has resulted in the usability of additional plant species and parts. Herbs and seeds play a role as spices. Roots and tubers, whose inedible bitter substances must be removed through more complex processing steps, enrich the menu. Numerous wild plants are also used in the production of all kinds of beverages—from herbal teas and juices to beer, wine, and gin, and, last but not least, Amarula, a liqueur made from the tasty marula fruit of a wild tree *(Sclerocarya birrea)*. It is uncertain when our ancestors began to use spices and the like. Even if the exact timing of this development from the first mastery of fire to simple cooking and roasting to complex cooking is far from clear, our results show that the use of fire for food preparation, in particular, is a decisive step towards effective food yield.

Fig. 3

The baobab or monkey-bread tree *(Adansonia digitata)*

This imposing tree, which is widespread in the African savanna, provides the most edible plant parts. Even without the use of fire, five of them are readily available to eat. The fruits of the baobab tree *(Fig. 1 and below)* contain a floury pulp that is very nutritious and rich in vitamin C, as well as fatty, nutrient-rich seeds that are very tasty and easy to digest raw and roasted. Blossoms, young shoots, and root shoots are also edible. The leaves can also be eaten as vegetables when cooked over a fire. They are high in protein and are often used as an ingredient in sauces. Both the fruits and the dried leaves can be stored for several months. The soft, fibrous wood of the baobab tree stores a lot of water and is also a source of water. The fruit from the baobab tree is a highly valued part of the diet of today's hunting and gathering groups in the Kalahari. One can assume that they were an important source of food for early humans as well.

3 Examples of edible parts of South African plants: **1** sugary fruit of a type of fig *(Ficus sur)*, **2** tasty fruits of the bird gooseberry *(Hoslundia opposita)*, **3** *Ceropegia barberae,* whose root tuber can be eaten raw, **4** wild potato tubers *(Plectranthus esculentus),* a popular source of starch, **5** *Phoenix reclinata* whose juice is used to make palm wine, **6** fruits from the marula tree *(Sclerocarya birrea)*.

Further reading

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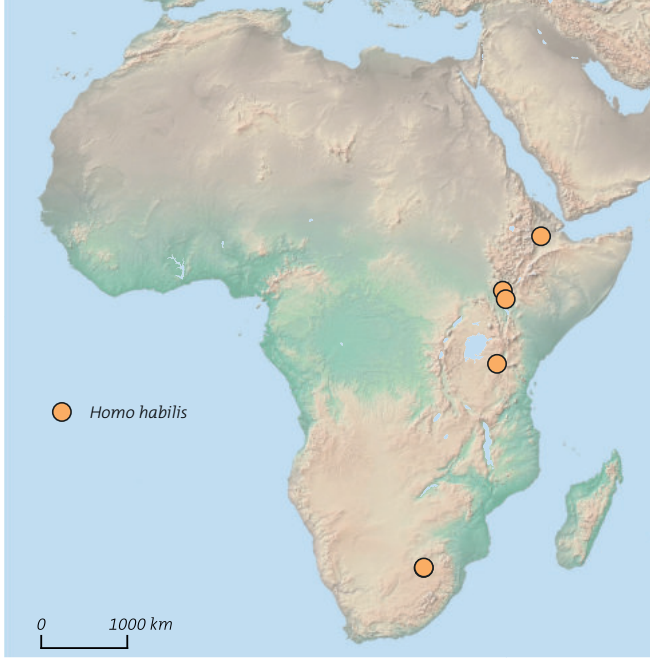
Homo habilis

Profile



Discovery

The first *Homo habilis* find – a lower jaw bone – was discovered in 1959 by Heselo Mukuri at Olduvai Gorge.

Sites

Kenya: Koobi Fora, Ileret.

Tanzania: Olduvai.

Ethiopia: Hadar.

South Africa: Sterkfontein, Swartkrans, Kromdraai.

Finds

lower jaw bones, skull bones, teeth, hand and foot bones, upper arm and thigh bones.

Age

2.3–1.5 million years.

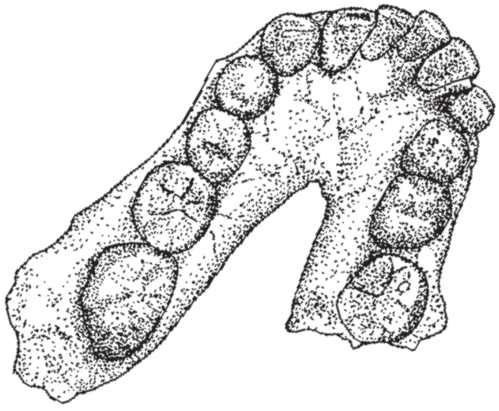
Brain size

590–687 cm^3, possibly greater than 800 cm^3.

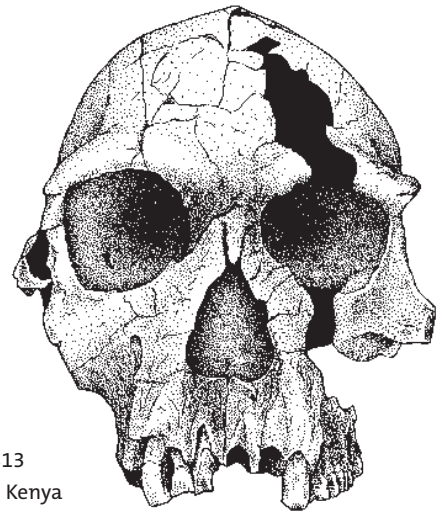
Characteristics

Homo habilis is the most difficult species to grasp. For a long time, individual finds were assigned to this species because it was the only described human species with this old age. Fossils that belong to *Homo habilis* show features of both australopithecines, for example the shape of the teeth, and *Homo* species. They had remarkably small brains compared to other members of the genus *Homo*. *Homo habilis* was placed in the genus *Homo* due to the stone tools found nearby. In the 1960s it was assumed that only real humans, i.e. those of the species *Homo*, could make tools. Today we have evidence of stone tools from time periods long before *Homo habilis*. They were probably in use before the genus *Homo* evolved.

Facial reconstruction



Lower jaw OH7 from Olduvai, Tanzania



Skull KNM-ER 1813 from Koobi Fora, Kenya