Silphion



This miracle plant was eaten into extinction 2,000 years ago—or was it?

Silphion cured diseases and made food tasty, but Emperor Nero allegedly consumed the last stalk. Now, a Turkish researcher thinks he's found a botanical survivor.

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Text: Taras Grescoe Photographs: Alice Zoo Illustrations: Nirupa Rao Video: George Selley

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History of Silphion

From before the rise of Athens to the height of the Roman Empire, one of the most sought-after products in the Mediterranean world was a goldenflowered plant called silphion. For ancient Greek physicians, silphion was a cure-all, prized for everything from stomach pain to wart removal. For Roman chefs, it was a culinary staple, crucial for spicing up an everyday pot of lentils or finishing an extravagant dish of scalded flamingo. During the reign of Julius Caesar, more than a thousand pounds of the plant was stockpiled alongside gold in Rome's imperial treasuries, and silphion

saplings were valued at the same price as silver.

But just seven centuries after the adored plant was first documented growing along the coast of <u>Cyrenaica</u>, in what is now modern Libya (according to one chronicler, it was in 638 B.C. after a "black rain" fell) silphion disappeared from the ancient Mediterranean world. "Just one stalk has been found," Roman chronicler Pliny the Elder lamented in his *Natural History* in the first century A.D., "and it has been given to the **Emperor Nero.**"



Bees partake in flowering Silphion in central Turkey in May 2021. Professor Mahmut Miski observed that insects drawn to the plant's sap began to mate, reminding him of ancient accounts of silphion's alleged aphrodisiac qualities. Screen capture from a video on the National Geographic website.

Since the Middle Ages, botanical explorers inspired by ancient accounts of this remarkable plant have sought it on three continents, and always in vain. Many historians view the disappearance of silphion as the first recorded extinction of any species, plant or animal, and a cautionary tale in how thoroughly human appetite can erase a species from the wild.



Left: Istanbul University professor Mahmut Miski holds a flowering stalk of Ferula drudeana in the foothills of Mount Hasan. He first encountered the plant in 1983, but it wasn't until nearly 20 years later that the researcher started noting its similarities with ancient silphion. **Right**: These mature Ferula drudeana plants are believed to be around 15 years old. Abundant snowmelt in 2022 irrigated the site they grow in central Turkey, resulting in a riotous bloom of intoxicating flowers.

But is silphion truly extinct? Thanks to a lucky encounter almost 40 years ago, and decades of subsequent research, a professor at Istanbul University suspects he has re-discovered the last holdouts of the ancient plant more than a thousand years after it disappeared from history books, and nearly a thousand miles from where it once grew.

A "chemical gold mine"

On a sunny morning in October of last year, <u>Mahmut Miski</u> stood in the boulder-strewn foothills of an active volcano in the Cappadocia region of central Turkey, sweeping an arm towards a thicket of grooved, buffcolored stalks shaded by wild pistachio trees. "Welcome to 'silphion land," the 68-year-old professor said, as he stooped to pull a stalk and its gnarled

root from the rocky soil. The root ball the chemical factory of the plant perfumed the air with a pleasant, slightly medicinal odor, halfway between eucalyptus and pine sap. "To me, the smell is stimulating, as well as relaxing," Miski explained. "You can see why everybody who encounters this plant becomes attached to it."

Miski, whose field at Istanbul University is <u>pharmacognosy</u>, the study of medicines derived from natural sources, had first seen the modern plant he now believes to be the silphion of the ancients while doing postdoctoral research 38 years earlier. He'd received a grant to collect specimens of *Ferula*, a genus of flowering plants in a family (*Apiaceae*) that includes carrots, fennel, and parsley, and has a reputation for yielding many novel disease-fighting compounds.



Mahmut Miski inspects the Ferula drudeana plants he propagated in collaboration with staff at Istanbul's Nezahat Gökyiğit Botanical Garden. Ancient accounts describe failed attempts to transplant silphion from what is now coastal Libya to mainland Greece; Miski's team also found Ferula drudeana difficult to propagate, even under controlled conditions in a greenhouse.



Extracts and resins collected from the root of Ferula drudeana in Mahmut Miski's laboratory at the University of Istanbul. Analyses of the root extracts have revealed cancerfighting and anti-inflammatory compounds, as well as one that may be responsible for or the plant's intoxicating smell —a feature of silphion frequently noted by ancient writers.



Miski uses a magnifying glass to inspect seeds collected from Ferula drudeana, the plant he believes to be silphion. Ancient accounts describe the disappearance of the plant in the first centuries A.D., with its last mention occurring in a letter from the Bishop of Cyrene (modern Libya) in 406. On a spring day in 1983, two boys from a small Cappadocian village led Miski along a precipitous dirt road to the slopes of Mount Hasan, where their



family eked out a living growing barley and chickpeas. Behind fieldstone walls that protected the plants from grazing livestock, the brothers showed Miski several unusually tall *Ferula* plants with thick stems that oozed an acrid-tasting resin. The professor's research eventually revealed that only one other specimen of this plant had ever been collected—back in 1909 at a site 150 miles to the east of Mount Hasan—and was subsequently identified as a new species: *Ferula drudeana*.

Miski's hunch that *Ferula drudeana* would prove to be a chemical gold mine turned out to be correct: Analyses of the root extract identified 30 secondary metabolites—substances which, while they don't contribute to the primary business of helping a plant grow or reproduce, nonetheless confer some kind of selective advantage. Among the compounds, many of which have cancer-fighting, contraceptive, and antiinflammatory properties, is shyobunone, which acts on the brain's gammaaminobutiric acid (GABA) receptors and may contribute to the plant's intoxicating smell. Miski believes that future analyses of the plant will reveal the existence of dozens of yet-to-beidentified compounds of medical interest.

"You find the same chemicals in rosemary, sweet flag, artichoke, sage, and galbanum, another *Ferula* plant," the professor marvels. "It's like you combined half a dozen important medicinal plants in a single species."



Botanical illustrator and National Geographic Explorer Nirupa Rao worked with photographs and descriptions from Mahmut Miski to create a painting of Ferula drudeana and its distinctive, ginseng-like root. Illustration by Nirupa Rao



"It's honestly one of the toughest plants I've had to paint because of its exponential branching pattern," says Rao. "Each individual flowering stem branches out into 3-9 lateral 'umbels,' each of which has 16-20 rays or 'umbellules,' and each of those culminates in 14-22 tiny flowers."

Compelling similarities

Ferula drudeana clearly held medical potential, but it was only on a return visit to Mount Hasan in 2012 that Miski began to ponder its similarities with the silphion plant he'd read about in old botanical texts. The young caretakers of the *Ferula* plants had told the professor how sheep and goats loved to graze on its leaves, which reminded him of a description in Pliny's Natural History of sheep being fattened on silphion. Miski also observed that after being drawn to the pearl-colored sap, flying insects began to mate, which made him think of legends that celebrated the ancient plant's aphrodisiac qualities.

In a <u>2021 paper published in the journal</u> **<u>Plants</u>**, Miski descibed the similarities between silphion, described in ancient texts and depicted on Cyrenaican coins to celebrate the region's most famous export, and *Ferula drudeana*: thick, branching roots, similar to ginseng; frond-like basal leaves; a grooved stalk rising towards extravagant circular clusters of flowers; celery-like leaves; and papery fruits, or mericarps, in the shape of inverted hearts.

Similarity in appearance wasn't the only compelling link. The original silphion was said to have appeared suddenly, after a great downpour. Miski observed that, when rains came to Cappadocia in

April, *Ferula drudeana* would spring from the ground, growing up to six feet in just over a month.



A silver tetradrachm and gold drachm minted in the 4th century B.C. in Cyrene (modern Libya) feature the image of the silphion plant. Cyrene was famed as the source of ancient silphion, and coins bearing its image, like these now in the American Numismatic Society collections in New York City, have been found across the ancient Mediterranean world and Asia.

Because ancient silphion resisted cultivation, it had to be harvested in the wild, a task that Cyrenaic nobles entrusted to desert nomads; two

- attempts (reported by Hippocrates) to transplant it to mainland Greece failed. Miski also found *Ferula drudeana* difficult to transplant; it was only by using cold stratification, a technique in which seeds are tricked into germinating by exposing them to wet,
- winter-like conditions, that his team was able to propagate the plant in a greenhouse.
- Since the early 19th century, three contemporary species have been put forth as potential candidates for being the long-lost silphion. The stalk and fruits of *Ferula tingitana*, known as giant fennel, resemble the plant depicted on Cyrenaic coins, and its resin is used

as a folk medicine in Morocco, but the plant's high ammonia content makes it virtually inedible.

Cachrys ferulacea has heart-shaped fruits and produces an agreeably scented resin, but its leaves don't correspond to the ancient descriptions; it is also a common plant in Italy and Greece, places the ancient sources made clear silphion didn't grow. *Margotia gummifera* comes tantalizingly close to the images depicted on coins, but the plant's range—which includes northwest Africa and the Iberian Peninsula—doesn't match, its stalk is too thin, and several studies have

concluded it has little value as a medicinal plant.

Dried samples of Ferula drudeana collected in 1983 by Mahmut Miski. The species was first identified by renowned Russian botanist Evgenii Korovin after the only other example of the plant was found in Turkey's Taurus mountains in 1909. The two Turkish populations of Ferula drudeana, separated by 150 miles, are genetically identical, leading Miski to believe they were deliberately propagated by human hands.



"Morphologically, *Ferula drudeana* seems to be the most likely candidate," says <u>Shahina Ghazanfar</u>, a research associate who specializes in the taxonomy of Middle Eastern plants at the Royal Botanic Gardens at Kew, London. "The striated stems, fruits, and possibly the root all seem to point to the idea that this *Ferula* species could possibly be a remnant cultivated plant in Anatolia that was known as silphion." Ghazanfar singles out the distinctive way the leaves are arrayed on opposing sides of the stem. "The opposite leaves, which aren't found in the other species, are particularly convincing."

A far-flung survivor?

While *Ferula drudeana* fits ancient descriptions of the silphion plant more closely than any other species yet proposed, there is a problem: Ancient descriptions were unanimous that the best silphion came exclusively from a narrow zone around the city of Cyrene, a site now occupied by the modern settlement of Shahat in Libya. The foothills of Mount Hasan are 800 miles northeast, as the crow flies, across the Mediterranean. When Miski presents his research at conferences, he emphasizes the fact that the plant has been recorded in two locations in Turkey, both of which had historic

Greek populations stretching back to antiquity.



Mehmet Ata (left) was just a boy in 1983 when he first led Mahmut Miski (right) to a stone enclosure in central Turkey where Ferula drudeana grows, and has been a caretaker for the plant ever since. Ata's family set up home in the area after Greek communities that had lived in the region since antiquity were expelled from the country in 1923.



Mehmet Ata plants a young Ferula drudeana plant, propagated by Mahmut Miski in Istanbul, in his garden in the foothills of Mount Hasan in central Turkey. Future analyses of the plant may reveal the existence of dozens of yet-to-beidentified compounds of medical interest.



A closer look reveals the delicate fronds of Ferula drudeana propagated at Istanbul's Nezahat Gökyiğit Botanical Garden. The Ferula genus of flowering plants includes carrots, fennel, and parsley; Turkey is home to half of the world's 200-odd Ferula species.



Mehmet Ata digs up a mature Ferula drudeana plant in May 2021 for use in a cooking experiment with food historian Sally Grainger. Until archaeologists find an ancient sample of silphion, perhaps from a labeled vessel, to compare against Ferula drudeana, researchers can only investigate how similar—or different—the living plant is to ancient descriptions.

Last October, Mehmet Ata, who as a boy led Miski to the orchard where the plant grew, directed us to a nearby village and showed us his childhood home, now abandoned, which consisted of a warren of dark rooms carved directly into volcanic rock. Ata, now a grandfather, explained that his family had taken possession of the home

sometime after the 1923 expulsion of Greeks from the region; before then, the village had been inhabited by Cappadocian Greeks who had inhabited villages in central Anatolia from the time of Alexander the Great, and Miski speculates that 2,000 or so years ago, a Greek trader or farmer tried planting silphion seeds that had been sent to him from North Africa.

"Because it takes at least ten years to mature, they might have planted it, then forgotten all about it. But the plant kept on growing in the wild, and ended up populating this small area," he offers. "The descendants of the original farmers wouldn't have known what the heck it was."

Erica Rowan, an associate professor in archaeobotany at Royal Holloway University of London, finds Miski's speculations plausible. "The ancients were very good at transporting things," Rowan points out. "There's no reason why people from Cyrenaica couldn't have brought the seeds to Cappadocia and planted them. They're similar enough, with a Mediterranean climate. And this *Ferula* species does look like what's shown on the coins."

<u>Alain Touwaide</u>, a historian who specializes in medical plants of antiquity, is more skeptical, and questions the reasoning that "this is something Greek, because there were once Greeks there." Touwaide argues that Miski's team would make a stronger argument by isolating compounds in *Ferula drudeana* that play a similar medical role to those for which silphion was prescribed.

The problem is that ancient authorities seemed to prescribe the plant for just about everything. Silphion was a cure for baldness and dental pain, for pleurisy and epilepsy, and a balm, according to one lyrical translation, for both the "dog-bitten" and the "scorpionsmitten."



A sweeping view from the foothills of Turkey's Mount Hasan captures the yellow blooms of mature Ferula drudeana plants in the spring of 2021. Miski believes ancient Greek famers who once lived in the region may have brought the plant from what is now Libya thousands of years ago.



Mahmut Miski and Mehmet Ata inspect Ferula drudeana plants before Ata plants a sapling propagated in Istanbul in his garden near Mount Hasan in central Turkey in the spring of 2021. Captured from a video in the original.



A view of ruins from the ancient city of Nora in the foothills of Mount Hasan. Founded during the time of Alexander the Great, Nora became one of the largest cities in the region, boasting more than a thousand homes and dozens of



Plants grow among the ruins of ancient Nora. Mahmut Miski believes that silphion may have appeared in the region thanks to ancient Greek farmers who once tilled the area's rich volcanic soil.

The only real way to confirm whether they're one and the same is if we had remains of the ancient plant to compare for analysis, say from a jar clearly labeled "silphion" that's excavated from an archaeological site, says Lisa Briggs, a post-doctoral researcher at the British Museum and <u>National Geographic</u> Explorer. A recent paper she coauthored recommends the Libyan seaside town of Susa, the island of Malta, and the Greek port of Piraeus as good sites for archaeologists to look for the remains of shipwrecks that may have sunk while transporting silphion.

The culinary "Holy Grail"

In the absence of a well-labelled jar of silphion being hauled from the deep, most experts agree that there is one promising—though not surefire—way of supporting the idea that Ferula *drudeana* corresponds to the silphion of the ancients: somebody would have to eat it. "Its medical properties were important to the ancients, but silphion's defining characteristic was that it was a seasoning," says Rowan.

Unlike classical medical texts, which tend to be vague on details, the cookbooks that survive from antiquity are often explicit about quantities and techniques. The most famous, a handbook of 475 recipes that took its final form in the fourth century A.D., is known as <u>Apicius</u>, after a celebrated gourmet who lived under the reign of Roman emperor Tiberius (r. A.D. 14-37). Dozens of recipes in the compilation call for silphion, in one of three forms: pure gum resin, referred to as laser vivum; resin mixed with flour (*laserpicium*); or the dry root (*laseris radix*), which is generally cut into pieces and crushed in a mortar and pestle with other seasonings.

For <u>Sally Grainger</u>, a researcher who co-edited the <u>authoritative English</u> <u>translation of Apicius</u>, "finding the original silphion, and experiencing

ancient recipes afresh with it, is a kind of Holy Grail."



Watch a food historian test ancient recipes with "silphion". Video in the original: Food historian Sally Grainger cooks ancient Roman recipes using Ferula drudeana with professor Mahmut Miski in Istanbul's Nezahat Gökyiğit Botanical Garden.

Grainger, who worked as head pastry chef at London's Atheneum Hotel for five years before earning a degree in ancient history, demonstrates Roman cooking techniques on her "<u>A Taste of</u> <u>the Ancient World</u>" YouTube channel. Until now, she recreated recipes calling for Libyan silphion using a lowerquality substitute mentioned in Apicius:

"Parthian laser," which is believed to be asafoetida, a resin derived from another *Ferula* species that grows in Afghanistan and is used in contemporary Indian cuisine under the name *hing*. When the original silphion became hard to find, Roman chefs began to substitute the cheaper and more abundant asafoetida, and Apicius makes a clear distinction between the high-class Libyan plant and its more pungent, sulfurous eastern cousin.

On a sunny May morning in Istanbul's <u>Nezahat Gökyiğit Botanical Garden</u>, Turkey's most important repository of plant biodiversity, Grainger and Miski gathered at a makeshift outdoor kitchen

to find out if *Ferula drudeana* may indeed be culinary history's Holy Grail.



Noted food historian Sally Grainger prepares an ancient Roman dish using Ferula drudeana during an experiment at Istanbul's Nezahat Gökyiğit Botanical Garden. "[Silphion] is a fascinating plant, and I can understand why the Romans craved it," she says.



Sections of Ferula drudeana are ready to be incorporated into the cooking experiment. As a control, a version of each dish prepared with the plant was also prepared with asafoetida, a resin derived from another Ferula species that was considered a lesser substitute for silphion by ancient cooks.



Grainger prepares isicia, Roman "fish" dumplings made with prawn and served with silphion sauce, as part of the cooking experiment. Dishes prepared with Asa foetida held little appeal, while those made with Ferula drudeana were eaten with gusto. To the culinary historian, the plant from central Turkey is a good candidate for being the long-lost plant of the Greeks and Romans. The professor had just returned with plant samples from the foothills of Mount Hasan, where Ata had been monitoring the plant's development. Snowmelt had abundantly irrigated the site, and the field was a riot of brilliant yellow flowers—*Ferula* plants in full bloom meant the roots would be at their most pharmacologically active. Grainger had traveled from the UK with mortar and pestle, as well as all the spices and condiments needed to recreate recipes from Apicius, including sweet wines, the fermented fish sauce *garum*, and herbs such as rue and lovage.

Now, as terracotta pots full of lentils stewed over charcoal braziers, Miski presented the chef with a thick, ridged stalk of *Ferula drudeana*, pearl-colored sap oozing from a fresh cut. Grainger dropped a lump of hardened resin collected from the plant into a pan of heated olive oil, the first step in making laseratum, a simple silphion-based dressing. A distinctive scent filled the air.

"It's intense and delightful," said Grainger. "When you smell it, your saliva flows."

As picnic tables began to fill with plates from half a dozen Roman recipes—each with a version flavored with *Ferula*

drudeana and one flavored with silphion's ancient replacement, asafoetida—a crowd including the botanical garden's directors and staff and Miski's students gathered around for samples. A bowl of aliter lenticulum, lentils made with honey, vinegar, coriander, leek, and *Ferula drudeana*, was deemed complex and delicious, while the same dish made with pungent asafoetida resin provoked grimaces and was left largely untouched. Squash sautéed with the plant's grated root was also eaten with gusto, as was a delicate dish of prawn dumplings referred to in Apicius as *isicia*, dipped in the laseratum sauce. The biggest success,

though, was *ius in ouifero fervens*, a sauce for lamb made with sweet wine and plums spiced with an ample dose of *Ferula drudeana*.

"It's beautiful!" said Grainger, as she rested in a lawn chair after a long day on her feet. "Even though the sauce is rich and dense, the flavor of the silphion isn't buried by the fruits and spices. It has this intense 'green' flavor that actually brings out the qualities of the other herbs in the sauce." A version made with asafoetida was obnoxiously pungent. It was obvious Grainger believed *Ferula drudeana* had great gastronomic merit and was a good

- candidate for being the long-lost plant of the Greeks and Romans.
- Miski seemed pleased with the results of Grainger's experiments, and surprised by the taste, though he confessed he was concerned about what might happen next.
- "There are only 600 individual plants we know of in the whole world," he pointed out. Three hundred of them grow in the wild. An equal number are now being grown from seed in the botanical gardens, though it will take several years before any of them are mature enough to produce fruiting bodies. "You'd have to grow a thousand

- times as many plants to produce a commercial supply."
- Two thousand years after the original supply of silphion was cut off, the legendary plant may have reemerged only to face a threat from its ancient nemesis: human appetite. For the time being, numbers are so low that *Ferula drudeana* officially qualifies as a critically endangered species.
- "That's what's stressing me out," says Miski, a genuine note of alarm in his voice. "If everyone starts making silphion sauce, wait! We're not going to have enough to go around."

Notes

Source:

https://www.nationalgeographic.com/his tory/article/miracle-plant-eatenextinction-2000-years-ago-silphion

Mahmut Miski's paper in Plants is freely available at https://www.mdpi.com/2223-7747/10/1/102/pdf? version=1609926557

Taras Grescoe is the author of *Straphanger* and seven other non-fiction books. His next book, The Lost Supper: *Why the Future of Food Lies in the*

Past, will be published by Greystone in 2023.Follow him on Twitter (https://twitter.com/lostsupper) and learn more about his writing on his website

(https://www.tarasgrescoe.com/)

Alice Zoo is a documentary photographer whose work explores ideas of ritual and meaning. She recently photographed a story for National Geographic Magazine on Stonehenge and the Neolithic building boom. See more of her work on her website (<u>https://www.alicezoo.com/</u>) and on Instagram (<u>https://www.instagram.com/accounts/lo</u> gin/?next=%2Falice.zoo%2F).

The National Geographic Society, committed to illuminating and protecting the wonder of our world, has funded Explorer **Nirupa Rao'**s work as a botanical illustrator since 2016. See more of her work on her website (<u>https://www.nirupa-rao.com/</u>) <u>website</u> and on Instagram (https://www.instagram.com/accounts/lo gin/?next=%2Fniruparao%2F).

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