

## The Etymology of *Zea*

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As a personal project, I have been researching the etymology of the name *Zea*. Though the history of the name is fascinating, I could not find a single summary in the literature, and so decided to write one myself. This summary not being suitable for any journal I could think of, I decided to leave it in an informal style and submit it to the Cooperative Newsletter. I hope that others find this story as interesting as I have.

In short, the name *Zea* referred to spelt or emmer for thousands of years. Linnaeus originally named maize *Thalysia* in his very first publication, but he used this name only once, deciding shortly thereafter to abandon it and requisition the name *Zea*. Though he gave clear reasons for rejecting the other extant names for the genus, his reasons for choosing *Zea* are unclear, since he knew the genus to be exclusively American and that it did not resemble spelt in any way. Given the justifications he made for similar choices, I believe that he chose *Zea* not due to any similarity between maize and spelt, but out of a desire to preserve a name with a millennia-long history and a prominent place in Greco-Roman sources.

The Greek word ζεία (*zeia*) dates back to the oldest known works of Greek literature, appearing in Homer's *Iliad* and *Odyssey* and Hesiod's *Works and Days* as part of the phrase ζείδωρος ἄρουρα (*zeidoros aroura*, "corn-giving earth"). The etymology of this ancient phrase was thereafter the subject of occasional bickering for a few thousand years. Though *zeidoros* most directly translates to "zeia-giving" (euphemistically, "corn-giving" or "grain-giving"), it could also be derived from the Greek word ζάω (*zao*, to live) and thus mean "life-giving." As *zeidoros* appears before *zeia* in the written record, this would imply that the grain's name was similarly derived from its life-giving properties. Pliny the Elder asserted in *Naturalis Historia* (77-79 CE) that *zeidoros aroura* came from the "very considerable celebrity" of the hearty grain *zeia* and most certainly did *not* mean "life-giving," as was apparently widely believed by his contemporaries. This did not stop the the Greek grammarian Hesychius from reiterating the "life-giving" etymology in his

*Alphabetical Collection of All Words* (c. 5<sup>th</sup> century CE). Various authors have sided with either authority since then: Leonhard Fuchs repeated Pliny's argument in *De historia stirpium commentarii insignes* (1542), while the French botanist Matthieu Bonafous supported Hesychius' etymology in his *Traité du maïs* (1833).

The three core texts of the Greco-Roman botanical canon- Dioscorides' *De Materia Medica*, Theophrastus' *Historia Plantarum*, and Pliny the Elder's *Naturalis Historia*- all described *zeia* as a rustic grain similar to wheat, traditionally translated as spelt or, more rarely, emmer. Theophrastus described it as the strongest among the grains that were not

wheat or barley but one that “exhausts the ground,” while Dioscorides noted single-seeded and double-seeded forms, both more nourishing than barley but less so than wheat. Pliny distinguished between *zea* (the Latin spelling) and *far*, which has also been used for both grains.

### **The short-lived *Thalysia***

Linnaeus originally named maize *Thalysia*, after a festival or harvest offering to the Greek goddess Demeter, enshrined in a pastoral poem of the same name by Theocritus. He used this name only once, in his very first publication, the first edition of *Systema Naturae* (1735). Over the next twenty years, Linnaeus would revise and expand *Systema Naturae* into an exhaustive 2300-page tome, the foundation of zoological taxonomy. This first edition, however, was a scant twelve pages, certainly an ambitious length in which to lay out his classification schema for every living thing (and all the world’s minerals to boot). Linnaeus was bound to make a few missteps in his first publication, and it seems *Thalysia* was one of these. He did not use the name again in any other work, except to include it among other deprecated names.

The usage of *Zea* for maize has no precedent before Linnaeus’ *Hortus Cliffortianus* and *Genera Plantarum*, both published in 1737. In 1735, Linnaeus took a post as curator at the estate of the wealthy Dutch banker George Clifford. Clifford’s estate boasted an extensive herbarium and several greenhouses, replete with species from across the world. For the next two years, Linnaeus cataloged and categorized the plant genera therein and refined his system of generic and specific names, ultimately producing *Hortus Cliffortianus* and *Genera Plantarum*. The two texts work in concert, with *Hortus Cliffortianus* furnishing each genus with a list of pre-existing names, justification for the name Linnaeus settled on, and a cross-reference to its entry in *Genera Plantarum*. That entry in turn describes the morphology of the genus’ flowers (the foundation of Linnaeus’ classification schema) in great detail. In both works, and in every Linnaean work that followed, the genus of maize was listed as *Zea*.

Dated correspondence shows that Linnaeus decided at the last possible minute to drop *Thalysia* in favor of *Zea*. From 1735 to 1737, he corresponded frequently with Johan Frederik Gronovius, a Dutch botanist who was his friend and benefactor, to discuss the printing progress of *Genera Plantarum*. The work was printed in batches as Linnaeus completed the entries, and most of Gronovius’ letters from this time revolve around updates on printing and additions or edits to be made. From the dates on these letters, we have a fairly detailed timeline of Linnaeus’ writing process, one that shows that Linnaeus renamed maize *Zea* very shortly before printing.

In a 1736 letter, Gronovius asked Linnaeus to make some final edits so that another batch could be printed. He noted that Linnaeus had left blank space for *Thalysia* (entry 702), but still had not written the entry itself, and so requested that he send the text to be

inserted. Though this letter was not dated, the entries discussed therein fall between those mentioned in two other letters, both dated. Thus Linnaeus decided to rename maize *Zea* between 15 June, when Gronovius had just received the manuscript for entries up to 507, and 26 September, when the entries up to number 717 had been printed. From the numbering, Linnaeus most likely made the decision to drop *Thalysia* and reassign *Zea* very shortly before printing. At the risk of overly dramatizing history, I find some comfort in the fact that history's most eminent botanist, when under a deadline, makes last-minute decisions.

### Rejecting the alternatives

In the entry for maize in *Hortus Cliffortianus*, Linnaeus noted a bevy of extant names. To understand why he rejected these, we must look to his rules for nomenclature, which he laid out (in true Linnaean fashion) in painstaking detail. Each decision to accept, reform, or reject a name was ultimately founded on *Fundamenta Botanica* (1736), a collection of 365 aphorisms giving a philosophical framework for why and how living things should be classified, as well as criteria for dividing bad names (lengthy, difficult to pronounce, based on color or size) from good ones (succinct, describing some consistent morphological feature, Greek or Latin root). When rejecting or accepting names in *Hortus Cliffortianus*, he often cited the relevant aphorism(s) from *Fundamenta Botanica*, occasionally clarifying with brief comments. For example, when he retracted *Thalysia*, his own name for maize, he made no explanation apart from citing aphorism 244: "New generic names should not be contrived, so long as adequate synonyms are readily available."

Most of the extant names noted in *Hortus Cliffortianus* fell into two groups: derivatives of the Taíno word *mahiz* and demonyms such as *Fruentum indicum* (Indian corn) or *Triticum turcicum* (Turkish wheat). Two of Linnaeus' most notable predecessors, Cesalpino and Tournefort, used derivatives of *mahiz* (Mays and Maiz) for the genus as a whole. Linnaeus, however, rejected these under aphorism 229 of *Fundamenta Botanica*: "Generic names that do not have a root in the Greek or Latin languages are to be rejected." No such rule existed for specific names, towards which Linnaeus took a much more lax view, and so he relegated *mays* to a mere species name.

Many of the demonyms used for maize correctly noted the American origin of the crop, though using the adjective "Indian," e.g. *Milium indicum* (Indian millet) or *Triticum indicum* (Indian wheat). Others, such as *Fruentum turcicum* (Turkish corn), purported an Asian origin, as discussed below. Linnaeus cited no specific reasons for rejecting these, though he used *Triticum* and *Milium* for other genera in *Hortus Cliffortianus* and disliked demonyms as a rule (see *Philosophia Botanica* 235).

The fascinating misnomer "Turkish corn" warrants a digression. Several other American species bore such misnomers in European sources in the 1500s, e.g. *Cucurbita pepo* (called "Turkish cucumber" or "Turkish melon" in several prominent herbals of the

time) and the eponymous meaty bird. A putative Turkish origin for maize was repeated by numerous sources. The first European herbals to describe maize, Tragus' *Kreüter Buch* (1546) and Rembert Dodoens' *Cruyde Boeck* (1554), both referred to it as a Turkish crop. The extreme similarity of their illustrations and several phrases in the text suggests that Dodoens borrowed heavily from Tragus' entry, likely repeating this false origin in the process. Caspar Bauhin's *Pinax Theatri Botanici* (1623) documented over twenty names for maize, many purporting an origin in Turkey or elsewhere in western Asia, such as *Fruentum asiaticum* (Asiatic corn) or *Triticum bactrianum* (Bactrian wheat).

Judging from successive editions and translations of Dodoens' highly influential *Cruyde Boeck*, the myth of a Turkish origin of maize was dispelled some time in the late 1500s. The original Dutch editions (1554, 1563) called maize *Fruentum turcicum* or *Bled sarrazin* ("Saracen wheat," Saracen being a generic term for Arab, Middle-Eastern, or Muslim) but did not mention its provenance. A later English translation by Henry Lyte (1578) added the name "Indian wheate," but maintained that it "groweth in Turkie." Not long after this, the first Latin translation (1583) correctly recognized that maize was "by no means from Asia" (*haudquaquam ex Asia*), but rather from the Americas, ostensibly Hispaniola. This misnomer has nevertheless survived as the modern *grano turco*, a colloquial Italian name for maize.

### **Linnaeus' justification for *Zea***

So, having ruled these other names out, why did Linnaeus choose *Zea* for an American genus that looks very little like spelt or emmer, the historical bearers of the name? His explanation in *Hortus Cliffortianus* is terse:

*Zea, peculiaris frumenti species a veteribus adscriptum nomen, huc usque vagum, recepimus ad designandum hoc genus loco Barbari istius vocabuli Mays. F.B. 229. Thalysia F.B. 244. Zea F.B. 242*

We have accepted this genus to be designated *Zea*, the name given by the ancients given to a specific species of grain, hitherto vague, in place of that barbarian name Mays. F.B. 229. Thalysia F.B. 244. Zea F.B. 242

The relevant aphorism, *Fundamenta Botanica* 242, states:

*Nomen genericum antiquum (241) antiquo generi convenit.*

An ancient (241) generic name is appropriate for an ancient genus.

What exactly did Linnaeus mean by "ancient"? The cited aphorism 241 discusses names given by the Greek and Roman "fathers" of botany (*nomina generica Patrum Botanicæ graeca vel Latina*), whom Linnaeus revered. It is reasonable to think that "ancient genus" would have a similar connotation, i.e. ancient Greek or Roman, not simply old. However, with *Zea*, Linnaeus gave an ancient Greek/Roman name to a genus he knew to be American and thus unknown to ancient Greek and Roman sources.

To resolve this apparent contradiction, we can look to Linnaeus' *Critica Botanica* (1737), which clarifies and expands on many of his aphorisms. Though he did not mention *Zea* in his discussion of aphorism 242, he discussed *Cactus* at great length, a genus with many relevant parallels to *Zea*. Both genera were of American origin, but widely known in Europe in the 1700s, and both names were originally Latin names for plants that were placed into genera named after their more famous relatives (*Zea* into *Triticum spelta*, *Cactus* into *Cynara cardunculus*), leaving the names unused. Several eminent botanists had named the genus of cacti *Opuntia*, a name Linnaeus rejected. This gave him the option to devise some new name, one which conveyed the very distinctive physical characteristics of cacti. However, the genus was widely known in Linnaeus' day as *Melocactus* (loosely, "melon thistle"), and in order to not upset the "common people" (*ne vulgo displicerem*), he decided to simply repurpose the ancient name *Cactus*, used by the ancient Romans for the similar-looking cardoon. The contradiction is thus resolved by a double standard: while an "ancient name" is strictly one from the ancient Greeks or Romans, a genus widely known for only a few hundred years can qualify as an "ancient genus."

Though this explains why Linnaeus had no problem repurposing an ancient Greek/Latin name for an American genus, the question remains as to why he chose *Zea* in particular, given that maize and spelt look quite different. Given the frequently poetic dimension to his work (partitioning his system into exactly 365 rules was certainly more of an aesthetic choice than a scientific one), I believe that his choice was not founded in morphology, but rests more on his esteem for the name itself. His main justifications for reassigning *Cactus*, which had been left unused after Linnaeus placed the cardoon with artichokes in the genus *Cynara*, were that it was both very ancient (*antiquissimum*) and very widely-known (*vulgatissimum*). This outweighed the fact, noted by Linnaeus himself, that designing a new name that was unambiguous and founded on invariant morphological features (the ideal construction according to *Philosophia Botanica*) would be very easy. In the case of *Cactus*, Linnaeus felt that the cultural and historical considerations of leaving an ancient Latin name unused outweighed his own scientific criteria. Given the ancient history of the name *Zea*, I believe this was also his sentiment when renaming maize *Zea*.

### **Genaust's Hypothesis**

To my knowledge, only a single author has put forward a hypothesis as to why Linnaeus chose *Zea* for maize. The German lexicographer Helmut Genaust addressed the question in his *Etymologisches Wörterbuch der Botanischen Pflanzennamen (Etymological Dictionary of Botanical Plant Names, 1976)*:

The long unanswered question, why Linnaeus now transferred the pre-Linnaean designation of spelt as a generic name to maize, finds its answer in the observation that the variety that is likely the oldest, *Zea mays* convar. *tunicata* (pod corn), has closed grains, as compared to dent corn (convar. *dentiformis*), today's most cultivated and highest-yielding

variety, in much the same way that spelt can be contrasted to the higher-yielding, free-threshing common wheat; moreover, the male flowers of maize are only two-flowered.

I find this explanation dubious. Though we now know that *Tu1* was a later mutation, the question is whether Linnaeus himself believed pod corn to be maize's ancestral form. This was almost certainly not the case. First, it was unlikely that Linnaeus had ever seen pod corn. There are no reliable European accounts of pod corn predating 1809, when Spanish officer Felix de Azara described a variety called *abatý-guaicurú* in his *Voyages dans l'Amérique méridionale*. Not long after this, the French botanist Auguste Saint-Hilaire announced his discovery of pod corn in an 1829 letter to the French Academy of Sciences. Both authors felt they had encountered something unprecedented: de Azara described *abatý-guaicurú* as "singular," while Saint-Hilaire announced his as "a remarkable variety." Such breathless descriptions would be unlikely if pod corn was known to Europe's most eminent botanist a century prior. Second, in *Genera Plantarum*, Linnaeus describes the calyces and corollae of female maize flowers as being especially short (*brevissimus*), clearly not the long, enveloping structures found on pod corn. The type specimen at Clifford's estate, of which only the tassel was preserved, was thus certainly not pod corn.

### Final thoughts

A newly discovered genus had heart-shaped marks on its seeds, and so Linnaeus named it *Cardiospermum*, or "heart-seed." This etymology is clear, unambiguous, easily summarized, and boring. I find the muddled, winding history of the name *Zea* to be much more fascinating. Greeks and Romans debated for centuries whether "*zeia*-giving earth," found in the earliest works of Western literature, was a metaphor for the life-giving properties of Mother Earth or simply a nod to a useful cereal. Europeans compiled a laundry list of mistaken homelands for maize, from the Arabian peninsula to the steppes of central Asia. History's most eminent botanist, under the gun from his publisher, made a last-minute decision to rename the plant which would become the world's most widely cultivated crop. Is the very messy, and thus very human, story of the name *Zea* not far more interesting than what can be said about so many other genera?

As Helmut Genaust said, the question of why Linnaeus transferred the name is a "long unanswered question." The simplest (and most cynical) answer is that if you are Carolus Linnaeus, you can name a genus whatever you darn well please. This explanation, however, is not a very satisfying one. Linnaeus spent his entire life creating and refining a nomenclature system, one that fused an obsession with clarity, poetic notions of a sublimely ordered universe, and a sense of inheritance from venerated ancients. His decisions may have had dubious justifications, such as his distaste for "barbarian" names, but they had justifications nonetheless. I believe his choice of *Zea* was not founded in any meaningful parallels between maize and spelt, but rather rested on his notion that names

with an illustrious history (to Linnaeus, synonymous with a lengthy history in Greek or Latin writing) must not be lost.