

GIANT ULLEUNG CELERY

Stephen Barstow¹, Malvik, March 2020

Scientific name: *Dystaenia takesimana*

Carrot family (*Apiaceae*)

English: Seombadi, Sobadi, Dwaejipul, giant Ulleung celery, Korean pig-plant, wild celery, giant Korean celery

Korean: 섬바디, 드와지풀

Norwegian: Ulleung kjempeselleri

Swedish: Ullungloka, Vulkanloka

The genus *Dystaenia* belongs to the carrot family or umbellifers (*Apiaceae*) and consists of two perennial species, one is a Japanese endemic (*Dystaenia ibukiensis*), and the other is endemic to a small island, Ulleung-do in Korea (*Dystaenia takesimana*). Genetic analysis (Pfosser et al., 2005) suggests that the larger *D. takesimana* evolved from *D. ibukiensis* rather than vice versa. The specific epithet *takesimana* is according to one reference to Takeshima Islet, which is disputed with the Japanese. *Campanula takesimana* is apparently found there. However, Takeshima island is also an alternative name for Ulleung-do, so this may be a misunderstanding. That Ulleung-do is Takeshima is confirmed on the following web site from the Oki Islands off Japan <http://www.oki-geopark.jp/en/flowers-calendar/summer> where it is stated that *Dystaenia takesimana* is also found there and is critically endangered: “*This plant was designated as Cultural Property of Ama Town in 2012. It has only been discovered on the two isolated islands of Ama Town of the Oki Islands (Nakanoshima Island) and Ulleung-do Island of South Korea. It can be seen on the Akiya Coast in Nakanoshima Island. It is called Takeshima-shishiudo, as Ulleung-do was referred to as Takeshima*” (see the map in Figure 1 for places mentioned here).

Ulleung-do is a rocky steep-sided volcanic island some 120 km east of the coast of South Korea, the highest peak reaching 984m. It is about 9.5 x 10 km across. In Europe it was formerly known as Dagelet or Argonaut Island. Its climate is classified as humid subtropical (Cfa). The following link gives other places in this climate zone, although the island is in the cooler part of this climate category: <https://tinyurl.com/yxnn4kd6>. Winter temperatures down to -13C have been recorded on the island and snow is not unusual. The quoted temperatures and climate zone presumably refer to sea level where most people live. Winters will be more severe at higher elevations.

My first record of being aware of this plant is a picture of it growing in the Copenhagen Botanical Garden on 25th May 2011 and then the incredible amount of spring growth the same plant had already put on by the middle of March 2014 (see pictures below). I commented at the time on a Facebook album: *I've seen this one mentioned as edible and is called Wild Celery...but there's not very much information. Judging by its vigorousness it's worth checking...however, a Korean informant tells me it's only fed to animals*”.

The plant is known as *seombadi* or *sobadi* in Korean (the pronunciation is similar to *somebody*) meaning *island-body* (maybe island herb). It is also known as *dwaejipul* or *pig-herb* and is said to be common in all parts of the island in different habitats, forming a ground cover in fertile soil in partial shade but also growing well in full sun. In English it has become known as Korean pig-plant, wild celery, giant Korean celery or just seombadi. I like to respect its origin and call it giant ulleung (winter) celery.

¹ edimentals.com; Malvik, Norway; March 2020

The Ethnobotany of Ulleung-do

Until recently, there was little information about the ethnobotany of Ulleung-do. Fortunately, a recent paper documents the traditional use of wild edible plants on the island (Ong et al., 2016) through interviews with 83 older informants. *Dystaenia* (*dwaejipul* or *pig-plant*) is only recorded by 3 informants as edible, the leaves and stems being soaked and parboiled by two people and fermented in soy sauce/soybean paste by the other person. Its main use, however, seems to have been as a fodder plant for livestock (e.g, Seong, 1977). The paper otherwise documents a large range of other wild edibles on the island and I've listed in the table the most commonly used (according to number of informants) together with how the plants are used. Several are familiar or related perennial vegetables.



Figure 1 Ulleung-do is at about the same latitude as southern Spain, Athens in Greece; San Francisco and Virginia in the US (Source: Google Earth)



Figure 2 *Dystaenia takesimana* in the Copenhagen Botanical Garden on a) 25th May 2011 and b) 16th March 2014 showing the incredible amount of new growth so early in the year.

The most commonly used wild edibles of Ulleung-do are *Allium victorialis* (Barstow, 2014) and *Aster pseudoglehnii*, a species only described in 2003 (there are a number of *Aster* species used as vegetables in the Far East, notably Korean *Aster scaber*: Barstow, 2014). The next two most used plants are less familiar to us in the west *Aruncus dioicus* (goatsbeard) is a big invasive in woodland near where I live. It was an important ornamental in Norway and is still commonly grown. It has a wide distribution from Asia through central Europe and North America. The young shoots are, however, documented used in Europe in the multiple species dish Pistic in Italy (Paoletti et al., 1995). *Solidago virgaurea* (goldenrod) is the other and has a similar geographical distribution to goatsbeard, but its use as a vegetable is only documented in the Far East, also on mainland Korea and in Japan. It's also interesting to see cow parsley (*Anthriscus sylvestris*) fairly commonly used, generally not used much in Europe due to the danger of confusing with poisonous members of the carrot family. Probably the most unusual wild edible green noted was an elderberry (*Sambucus*). On my visit to Japan I experienced (and survived) being served the immature flower umbels with green leaves of a red-berried elderberry served as tempura at a soba restaurant.

A fruit tree that permaculturists and ornamental tree growers may be familiar with is the endemic Ulleung rowan "Dodong" (*Sorbus ulleungensis*). It has large quite sweet berries. I remember being shown this tree and being served berries on a visit to Arne Jansson near Lund in Sweden (Figure 3). Arne is one of the founders of the Holma Forest Garden. This tree was first noticed and the Dodong clone was propagated in Europe as it was recognised to be a potentially valuable tree for landscape architects (see Chang and Gil, 2014). The Ulleung rowan is also documented as eaten on the island by Ong et al. (2014) The fruit are both eaten out of hand and infused in alcohol.

There is another older Korean paper investigating the use of seombadi for human food (Han and Chang, 1977) who found that it has a similar protein content as lucerne (*Medicago sativa*), that the taste was comparable to spinach when it was blanched for 8 minutes, but that bread made from leaf protein meal had food value but was too expensive to produce.

Europe and North America

The biggest attraction with seombadi as a vegetable is the fact that it grows well in winter even in relatively cold winter climates. Eric Toensmeier writes: "*Absolutely our best winter perennial vegetable. When Hablitzia is still 1" high, this one is 10" and growing fast. Comes up under snow and really our best or even only winter vegetable from early December through March. Flavor more or less like celery. Grows something like lovage but much better*

flavor and winter tolerance. It sailed through -15F (-26C) this winter” (Holyoke, Massachusetts).

The first time I found a source of seed for this plant was in November 2014 just as my book *Around the World in 80 plants* was published. I'd been trading seed with Aaron Parker (now of Edgewood Nursery) in Maine since 2009, when I sent him *Hablitzia tamnoides* for the first time. Aaron sent me his new seed list in November 2014 and *Dystaenia* was on it and I requested some seed. However, I asked him for more seed a year later saying that I was uncertain what had happened to the previous batch. In the meantime, Jonathan Bates of Food Forest Farm Nursery and co-author with Eric Toensmeier of the great book *Paradise Lot* contacted me in spring 2015 and offered me seed in return for some Korean *Aster scaber* seed which he and Eric had read about in my book! At the time, I thought I was OK with seed so I told him it wasn't necessary. However, the second batch didn't germinate and while on a visit to Denmark in August 2016, I was offered a couple of cuttings by my friend Søren Holt who had received them from Heine Refsing of the Danish "Center for Bio-diversitet". Heine told me recently that he has been growing this plant for some 25 years and has made a useful web page on this plant in Danish (<http://www.biodiverse.dk/seombadi/seombadi.htm>).



Figure 3 When visiting my friend Arne Jansson, one of the founders of the Holma Forest Garden in Sweden, he showed me his Ulleung rowan "Dodong" and later I was given a taste.

SUMMARY

In order to investigate the possibility of utilizing sombadi as a food resource the experiments of leaf protein extraction, bread adaptability with extracted leaf protein and cooking quality with fresh leaves as a side-dish were carried out and the results obtained are as follows.

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mic acid content was the highest as 5.56% in them.

3. It seemed to be possible to utilize sombadi as a side-dish if it was blanched in boiled water for 8 minutes and then cooked, the sensory evaluation score of cooked sombadi was similar to that of

1. Protein content of fresh leaves harvested in spring was higher as much as 0.76% than fresh leaves harvested in autumn, and extraction yield by pirie method was 18.21%

2. All kinds of amino acids were present in extracted leaf protein except methionine, and glutamic acid content was the highest as 5.56% in them.

3. It seemed to be possible to utilize sombadi as a side-dish if it was blanched in boiled water for 8 minutes and then cooked, the sensory evaluation score of cooked sombadi was similar to that of

4. The bread with dried powder and extracted leaf protein meal of sombadi had certain level of food value but the product were not so desirable from the viewpoint of its high production cost.

Figure 4 English summary of Han and Chang's 1977 paper on the utilization of *Dystaenia* as human food.

Table 1 Most important wild edible leafy green vegetables and selected other useful plants on Ulleungdo (Ong et al., 2016)

Species	Use	No. of informants
<i>Allium ochotense</i> (<i>Allium victorialis</i> subsp. <i>platyphyllum</i>)	Eat raw leaves; ferment leaves in soy sauce; boil or steam with grain; parboil leaves, ferment with chili and salt (kimchi); boil as a tea; boil in soup	52
<i>Aster pseudoglehnii</i>	Parboil young shoot, blanch and dry followed by parboiling and season; eat raw leaves	33
<i>Aruncus dioicus</i> var. <i>kamtschaticus</i>	Parboil young leaves/shoots; blanch and dry followed by parboiling and seasoning; in soups	29
<i>Solidago virgaurea</i> subsp. <i>gigantea</i>	Parboil young leaves / shoot; eat raw leaves; dry leaves and parboil to serve	28
<i>Cirsium nipponicum</i>	Used in soups; parboil young leaves/shoot; eat raw leaves	23
<i>Saussurea grandifolia</i>	Parboil young shoot; eat raw leaves; blanch and dry; ferment leaves in soy sauce	21
<i>Aralia cordata</i> var. <i>continentalis</i>	Parboil young leaves /shoots; eat raw leaves/shoot; ferment stems in salt/soy sauce; blanch leaves and dry	20
<i>Vitis coignetiae</i>	Eat young shoots (and fruit)	19
<i>Anthriscus sylvestris</i>	Parboil young leaves/shoots; ferment in salt; eat raw leaves	15
<i>Pueraria lobata</i>	Grind roots and process into flour cakes and noodles; dry and parboil	15
<i>Lilium hansonii</i> and <i>L. lancifolium</i>	Steam bulb or cook with grain; grind to flour cakes or noodles	15
<i>Campanula takesimana</i>	Parboil young shoot; eat raw leaves; blanch and dry followed by parboiling and seasoning	13
<i>Artemisia princeps</i> and <i>A. montana</i>	Various	11
<i>Kalopanax septemlobus</i>	Parboil young leaves; eat young raw leaves	11
<i>Allium macrostemon</i> , <i>A. monanthum</i> , <i>A. senescens</i> , <i>A. thunbergii</i>	Various	<10
<i>Eutrema wasabi</i>	Ferment /preserve leaves in vinegar and soy sauce; ferment in salt; ferment (kimchi), grind roots as condiment	8
<i>Aralia elata</i>	Parboil young leaves / shoot; soak root and process into noodles; eat raw shoots	5
<i>Sonchus oleraceus</i>	Parboil/steam young leaves/shoot; ferment / preserve leaves in salt; ferment / pickle whole plant (kimchi)	5
<i>Rubus</i> spp.	Eat young shoots	<5
<i>Fallopia sachalinensis</i>	Peel stem and eat core; parboil young leaves	4
<i>Camellia japonica</i>	Eat flowers	3
<i>Taraxacum platycarpum</i>	Parboil leaves and season; parboil roots; deep fry roots	2
<i>Zanthoxylum piperitum</i>	Ferment /pickle young leaves/shoots (kimchi); use fruit as seasoning	2
<i>Sambucus sieboldiana</i> var. <i>pendula</i>	Eat young leaves	1
<i>Oenanthe javanica</i>	Parboil shoots and season	1
<i>Clerodendrum trichotomum</i>	Eat raw leaves	1
<i>Smilax riparia</i> var. <i>ussuriensis</i>	Parboil young leaves	1

I finally planted *Dystaenia* in my garden from two sources:

1) Seed from a plant in the Gothenburg Botanical Garden (Figure 2) in Sweden which germinated in spring 2018 and 6 plants were planted out the same year.

2) Seed from the annual seed list of the Swedish gardening club Sällskapet Trädgårdsamatörerna (STA), donated by Hjalmar Rosengren in Hällingsjö in 2018. Curiously, he had contacted me in 2015 for information about its edibility as he had been asked to write an article about this plant in the STA magazine. This Swedish article was published at the end of 2018 (Rosengren, 2018, available at https://www.tradgardsamatorerna.se/wp-content/uploads/2018/12/Dystaenia_takesimana_TA-4_2018.pdf). It turns out that his plants also originated in the Gothenburg Botanical Garden where he bought it in the garden's shop in 2009. I sowed the seed on 12th February 2018 and they had germinated by 20th May when I pricked them out. 3 plants were planted in a different part of my garden on 10th August the same year.

I also have at least 1 plant from seed which Eric Toensmeier sent me. These were sown on 4th February 2019 and had germinated by 22nd May that year. It is currently overwintering in my cellar.

Key to introducing a new crop to colder areas than its native range would be the genetic diversity inherent in the plant and multiple introductions from the wild, preferably from higher elevations on the island where the plant may have adapted to colder conditions. So, where does the material being grown at present originate? Heine Refsing's experiences in Denmark are relevant here. He found that he lost a large number of plants over the first years due to a combination of cold winters and a heavier soil type than is ideal. Some did better than others and only the best survived.

So, where does the material being grown at present originate? Both Aaron Parker's Edgewood Nursery in Maine and Jonathan Bates' Food Forest Farm Nursery in Massachusetts have been doing a great job promoting this plant by making plants available in the US and Heine Refsing has been similarly spreading this plant in Denmark through the *Center for Bio-diversitet* (members are offered seed and plant offsets) and has also created a Facebook page "Seombadi - *Dystaenia takesimana*". It turns out that all the US and Danish plants can be traced back to plant breeder Professor Elwyn Meader (1910-1996) who introduced some 60 varieties of vegetables, fruit and ornamentals. A lot of his plant material originated from his time serving as a horticulturist for the US Army in Korea in the last world war. He was known for his generosity, disliked plant patenting and believed that the most valuable thing he'd ever done was to give things away. Meader collected seed of *Dystaenia* from Ulleung-do in 1953. He passed this plant on to Jack Kertesz of the Maine Organic Farmers and Gardeners (MOFG) in 1986. MOFG was the source for both Aaron Parker, Eric Toensmeier and Jonathan Bates, so that all the plants in the US probably have a direct lineage back to Meader's wild seed collection. Heine Refsing in Denmark also informs me his plants also originate in the US: Read more about Meader here: https://www.fedcoseeds.com/seeds/articles/breeder_Meader.htm.

The only plant I've found so far that doesn't originate from Meader is the one in the Gothenburg Botanical Garden which is a wild accession from Korea in 2009 (see <https://botaniska.gardenexplorer.org/taxon-38845.aspx>): Botanist Johan Nilsson from the garden tells me that it was indeed from wild collected they received from the Pyunggang Botanical Garden in Seoul, Korea and it's noted on the garden's plant database that the seed was collected at 980m. If that is true, this would be just below the highest peak at 984m and a perfect accession for northern climates. It could well be correct as there is a hike to the peak, Seonginbong, and the first video I found of this hike shows what must be this plant growing luxuriously by the side of the path (from 0:44 on <https://youtu.be/FFsoPrIhfMU>)!



Figure 5 Sign in the Gothenburg Botanical Garden

Dystaenia in Malvik

I must admit that I didn't really believe *Dystaenia* would survive in my garden. Although Eric Toensmeier reports that it has survived colder temperatures than it is likely to experience here, a given low temperature in Malvik is more extreme as there is no solar heating during the day as we lose the sun completely during mid-winter and when it's cold it can be about the same temperature for several days day and night.

Writing this in March 2020, I can report that all 9 plants have now survived two winters, but both winters have been unusually mild. During winter 2018-2019, I could dig the soil all winter. It was cold during some periods but there was always good snow-cover, insulating the plants well. This winter, it did freeze early in November until the end of December, but it was never really cold so that it was only frozen near the surface. The minimum temperature all winter has been only -11.5C (11F) and last winter -13.5C (8F). Warmer winters and earlier spring is a significant trend here, but also variability is increasing, so a cold winter could still occur. At the time of writing in mid-March, Eric Toensmeier is reporting that his plants are over a foot high, twice the size of any *Allium*, and *Hablitzia* shoots are only an inch or so tall. Similarly, plants in the Copenhagen Botanical Garden can be a harvestable size by mid-March (Figure 2).

Even in this mild winter here at 63.4N, it will be probably early April before my plants are large enough to harvest more than a taste (Figure 6). However, as I was very uncertain whether this species would survive a normal cold winter here (only 10 years ago we experienced a winter when the whole root system of the plants would have been frozen solid for 3-4 months), I kept a couple of large pot grown plants in my cold cellar which has been at around 6C during the coldest part of the winter and growth has been spectacular and I've been harvesting these plants for a few weeks now. I've used the shoots in several mixed vegetable dishes including curries, veggie pizza and soups. In the box and Figure 7 is an adaptation of a Korean coconut soba recipe with seombadi! All of the leaves and shoots in one pot was harvested for the meal! It was delicious, and in particular the seombadi greens had good flavour, crispy and juicy and not fibrous as I had feared!



Figure 6 Dystaenia takesimana has survived the last two unusually mild winters in Malvik (top, centre and bottom left from March 2020); (bottom right) plants overwintered in my cold cellar (6C) have grown well and been harvested regularly.

SEOMBADI COCONUT SOBA

Improvise on the following: gently fry garlic, nodding onion (*Allium cernuum*) shoots and bulbs in coconut oil for a few minutes, season with chili, fresh-ground coriander, golpar (ground *Heracleum* seeds) or cumin, crunchy peanut butter, soysauce, herbed salt, pepper, cooking for about 10 minutes, adding seombadi towards the end (none of the ingredients are essential apart from the seombadi!). Serve over cooked soba (buckwheat noodles), topped with garlic bulbil sprouts



Figure 7 Assembly of Seobadi coconut soba

There seems to be two opinions about the taste of the raw leaves.

Jack Kertesz wrote in a 20-year old information sheet about this plant: *"I find the flavor of this perennial celery to be a bit strong and sharp, with a lingering acidity in its raw state. Not everyone appreciates this quality, which likely could be reduced by blanching the dark green leaves, or by steaming or drying them. It does not have the pronounced aroma of lovage"*

On the other hand Aaron Parker says *"These nutritious leaves taste a lot like celery and are the best perennial substitute for that plant that I have tried"*.

Eric Toensmeier: *"Flavor more or less like celery. Grows something like lovage but much better flavor and winter tolerance"*.

Hjalmar Rosengren grows his plant as an ornamental and has no plans to eat it regularly. However, he had heard of it being edible and did try it, reporting *"..it has an aromatic taste similar to parsley and lovage"* (translated)

I also experience a slight lingering acidity but a friend I gave a sample to didn't. However, cooked it was fine. This may, sadly, limit it become popular.

It's likely to be an early spring crop here outside (April) and I'll certainly be growing it again in my cellar as I know of no other plant that grows so well just above freezing and winter vegetables have a premium value here. Rosengren (2018) reports that he knows no other perennial that has fresh green leaves for such a long period and new leaves appear again in the autumn after flowering.

There are other umbellifers of which the spring shoots are very hardy and various Angelicas often appear in mild periods in late winter (see Figure 8). When I first heard of *Dystaenia*, I thought immediately of another edible umbellifer, *Smyrniolum olusatrum* or Alexanders which can be seen in flower in mild winters in England already in February (see Figure 9), but it is nothing as hardy as *Dystaenia*.



Figure 8 Other members of the carrot family appear early in the spring in my garden, although not as early as *Dystaenia*: these pictures of *Angelica atropurpurea*, *Myrrhis odorata* and *Angelica archangelica* "Vossakvann" are all taken in the middle of March 2020.



Figure 9 Another relatively hardy winter edible member of the Apiaceae is *Smyrniolusastrum* (Alexanders), here photographed in Cornwall, England at the end of February.



Figure 10 Summer pictures of *Dystaenia takesimana* in Eric Toensmeier's Paradise Lot in Holyoke, Massachusetts (Photo: Eric Toensmeier)

Dystaenia in Summer and Autumn

Hjalmar Rosengren in Sweden says that what he calls vulkanloka in Swedish (Vulcano herb) has become one of his absolute favourite ornamental plants both because it is green for such a long time but also its stature and 20cm wide umbels of white flowers.

I've yet to grow my plants to flowering, so thanks to Eric Toensmeier and Jonathan Bates for the summer pictures at Paradise Lot in Figure 10 and Figure 11. Seeds start to ripen both in Maine and southern Sweden in September. Plants self-seed to a certain extent in the US. Jack Kertesz explains that "the original planting on my property slowly spread by seed but then disappeared" for an unknown reason. However, at the MOFGA Fairgrounds site it has thrived. A large flowering umbellifer scares some people off from growing it reports Rosengren (2018) thinking it will behave like the giant *Heracleum* species (giant hogweed and Tromsopalm), but he hasn't experienced any self-sowing in his southern Sweden garden.

In my world, plants that are both perennial, edible, ornamental and popular with pollinating insects are the most valuable (I term this class of plants *edi-ento-mentals*) and the Giant Ulleung Celery ticks all four boxes! That it can provide winter greens at a time of year when little else is available is its biggest advantage as a vegetable. That there is no indication that it would become invasive is also a plus!

Propagation

In his information sheet, Jack Kertesz wrote that Elwyn Meeder was told by a Suk Soon Lee that seed germinated better after soaking for 2-3 days and that they can be sown both spring and autumn. However, cold treatment (stratification) has worked well for me, sowing outside in February and germinating in spring. Although seed probably germinates better when fresh harvested from the previous season, Rosengren has also germinated older seed and considers this species as easy to propagate. Young plants and self-sown plants are reported to be easily moved.

Animal fodder

There are numerous Korean papers mainly in the 1970s and 1980s addressing the potential use of seombadi or Korean Pig Plant as a fodder crop (e.g., Seong, 1977), looking at issues of how to propagate on a larger scale. These attempts seem to have failed due to production costs. However, as pointed out on the Center for Bio-diversitet page, it is nevertheless well-suited on a smaller scale on traditional family farms and does not require much care once established. It is particularly valuable in Denmark as there is little else available apart from kales in winter. Jack Kertesz notes that he has sadly been unsuccessful in getting it established with any local pig farmers. In Ulleungdo, seombadi is said to be the favourite herb of the local cattle (yakso) which graze on it. This is said to give the meat a special "herbal fragrance" and this is used to market this local delicacy in local restaurants on the island.

Where to get seed or plants?

Currently, I only find offers of seed by Edgewood Nursery in the US (Aaron Parker) and Plant World Seeds in Devon, UK. The Experimental Farm Network in Pennsylvania also currently has seed as does B&T World Seeds. It's worth also checking seed lists of alpine garden and ornamental gardening clubs (NARGS, SRGC, AGS, STA in Sweden). Martin Crawford has also listed seed through his Agroforestry Research Trust this winter but is now out of stock. The current RHS Plant Finder in the UK lists 5 nurseries that stock this plant, but only one had plants available currently. Rühlemann's in Germany also sell plants currently!



Figure 11 Jonathan Bates demonstrating that seombadi can reach almost 3m in favourable conditions, here at Paradise Lot
(Photo: Jonathan Bates)

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Many thanks to Aaron Parker, Eric Toensmeier, Jonathan Bates, Heine Refsing and Jack Kertesz for sharing information and pictures.

Most of all, thanks are due to Professor Meader! Without your generosity and enthusiasm 30 years ago to share seeds, we wouldn't know about one of the potentially most useful permaculture plants!

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