Strawberry Basics – History and Propagation

Brunswick
Nourse Farm Photo

Topics covered:

1. **Project overview**
2. **Phenology (not phrenology)**
3. **Anatomy**
4. **Planting and care**
5. **History and culinary aspects**
6. **Varieties being evaluated**
7. **Distribution of plant materials**

Flavorfest
Nourse Farm Photo

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Strawberry Basics – History and Propagation

Who we are

Master Gardeners are community members who have been trained under the direction of the University of California (Davis) Cooperative Extension.

Each volunteer has completed more than 50 hours of formal classroom training.

Master Gardeners, agents of the University of California, assist the UC Cooperative Extension by providing practical, scientific gardening information to the home gardeners in the Lake Tahoe Basin.

The Lake Tahoe Master Gardeners offer research-based information by:

- Answering questions via email hotlines, farmers markets and at community events.
- Offering workshops and classes
- Publishing articles in newsletters, local newspapers and social media.

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What we do

Garden Lectures and Workshops

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Help with public gardens and hands-on workshops

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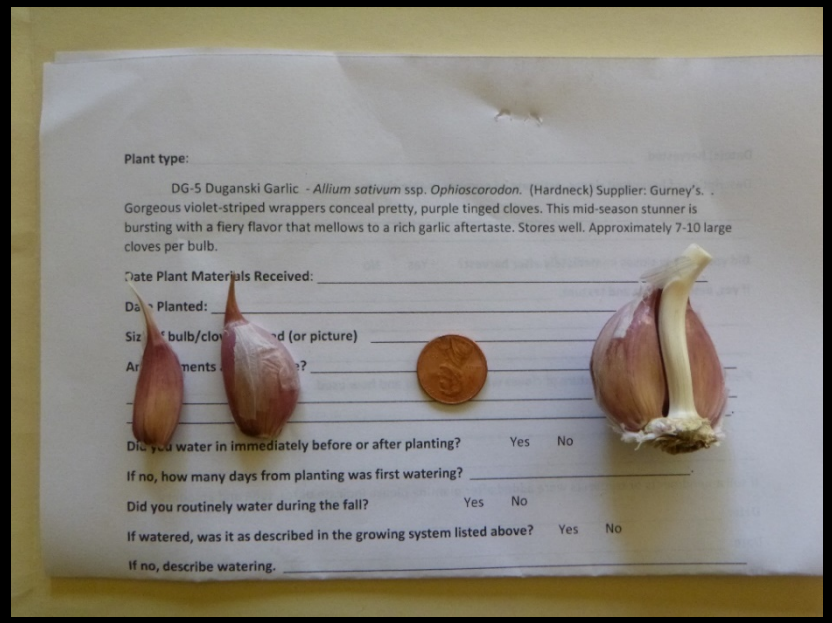

Phenology and grow-out trials involving fruits and vegetables

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Tahoe Daily Tribune Photo

Assist with school gardening programs

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Answer Gardening Questions at Farmers' Markets

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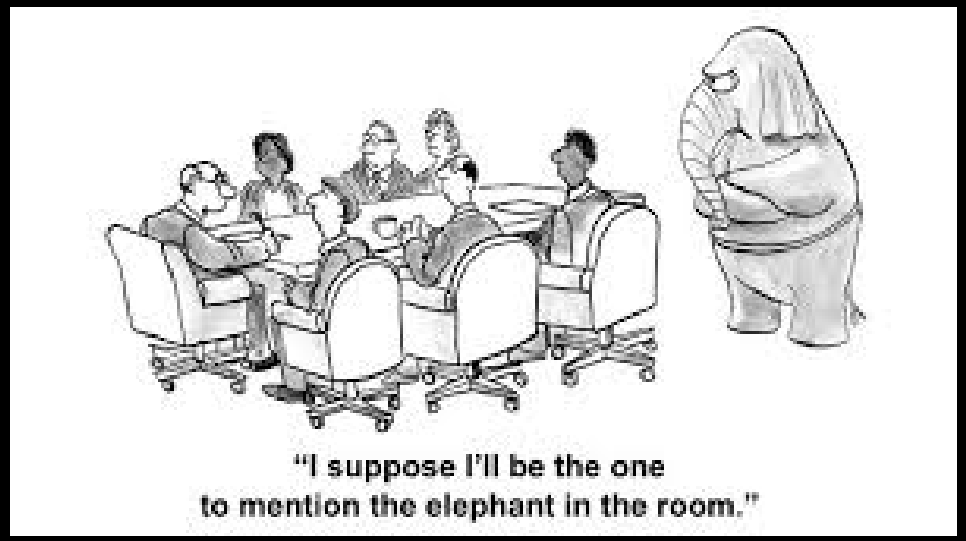

Altitude – Distance between object and ground surface

Lockheed SR-71 Blackbird

High Elevation Gardening

Lake Tahoe 6225'

Elevation – vertical distance from ground surface to sea level

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Phenology

Phenology looks at growth and development differences between plant varieties that are due to **weather and climate**.

Merriam-Webster on-line Dictionary

Varietal Comparative Phenology (VCP) looks at growth and development differences between plant varieties that are due to **weather** and climate.

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The importance of Varietal Comparative Phenology:

Malwina
Nourse Farm Photo

1. Method may be used in identifying early mid and late season varieties
2. Can be the basis of defining a new variety
3. Provides important information on plant development to growers
4. May have importance in IPM strategies
5. Important consideration for bringing produce to market

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Tahoe native strawberries

Fragaria vesca

Fragaria viginiana

The wild strawberries found in the Tahoe basin are either *Fragaria vesca*, the wood strawberry (alpine strawberry) or *Fragaria viginiana*, the mountain strawberry. There also undoubtedly a number of escaped cultivars of our commercial berries (*F. x ananassa*). Field identification between *the species* can be problematic, as overlap occurs. The main differences are in leaf characteristic. *F. vesca* leaves are slightly more serrated (12-21 above and below the middle) and the leaf petiole shorter to the individual leaflets. F. virginiana has fewer serrations above the middle of the leaf (7-13), and a slightly longer petiole to the individual leaflets.

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A Note on strawberry genetics

Strawberries, a member of the *Rosaceae* family, can be segregated based on chromosome numbers.

F. vesca 2N=14
F. virginiana 2N=56
F. chileoenis 2N=56
F. x ananassa 2N=56
F. moschata 2N=42

The multiplying of the chromosomes is called polyploidy and is fairly common in plants, with any number of examples found in the *Rosacea* family. What causes polyploidy has been greatly discussed, with a number of environmental, chemical, and hybridization opportunities as contributing factors.

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Varietal Comparative Phenology Does Not Typically

Mara des Bois
Nourse Farms Photo

1. Look at disease resistance
2. Plant appearance
3. Plant or produce growth habits

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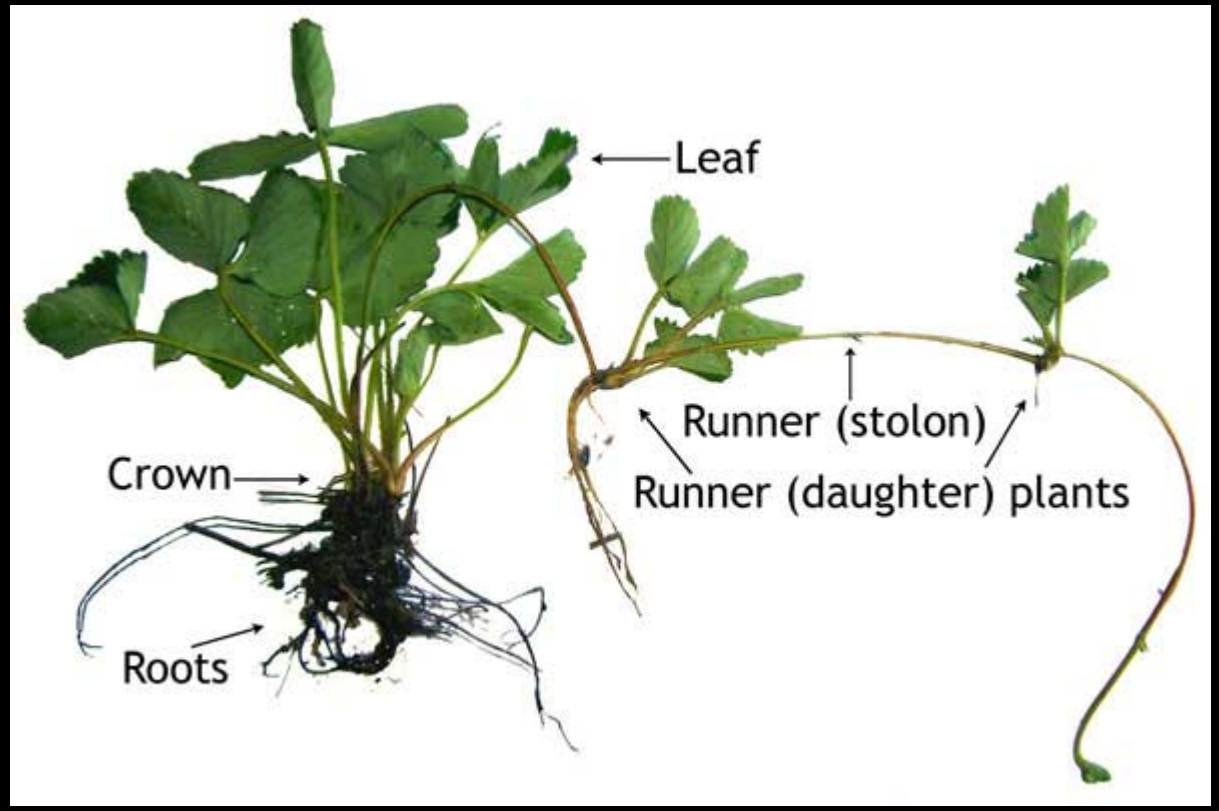

Primary vegetative structures of a strawberry plant

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Planting Options

Seeds – Require conditioning for best results
Crown Divisions – Higher mortality, sets back development
Bareroot – Most economical, easy to source plants
Plant Plugs – Limited availability for home gardens
One Year old plants – Commonly available at nurseries
Daughter Plants – Only from varieties that have runners

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Strawberry seeds require conditioning prior to planting. Most commercial cultivars of *F. x ananassa will not be true to variety.*

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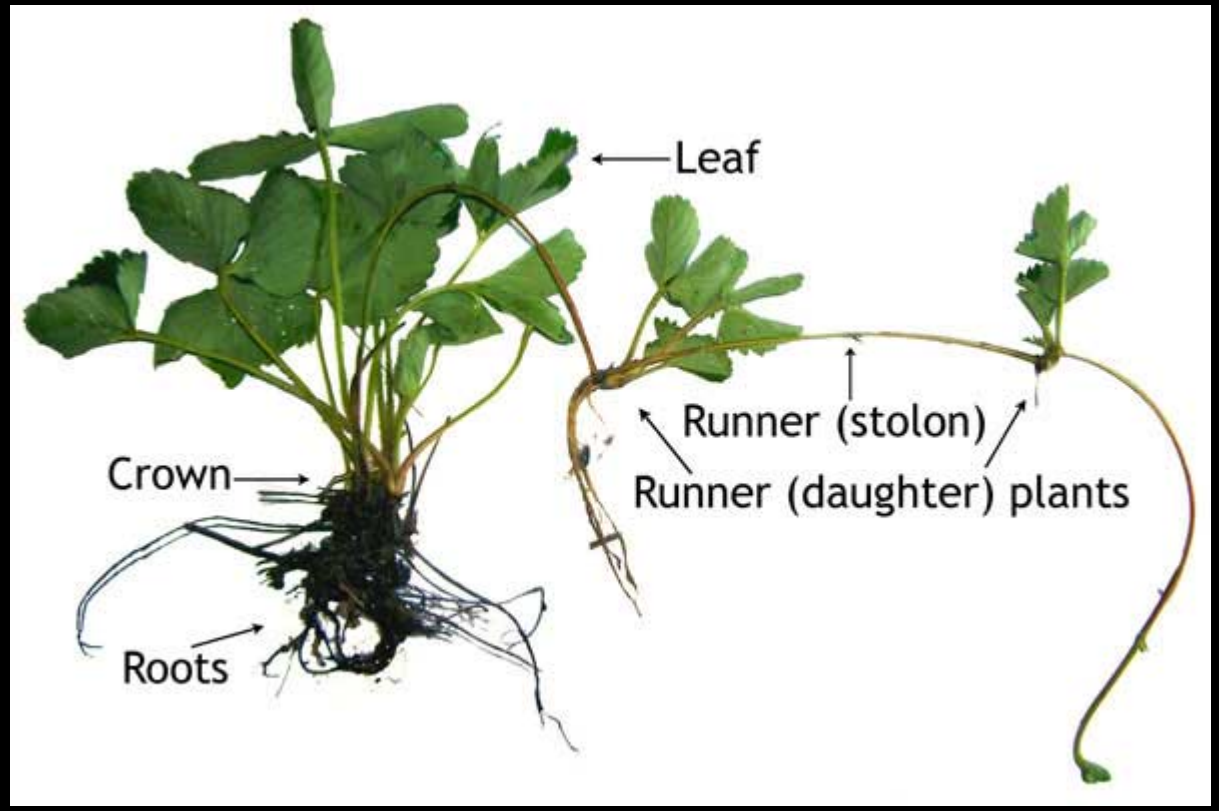

Daughter Plants form at the nodes of stolons

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Plant plugs are current year plants that are grown in greenhouses for transplanting to the field or garden. For cultivars of commercial berries (*F. x ananassa*) tissue culture is a common method to produce plant plugs.

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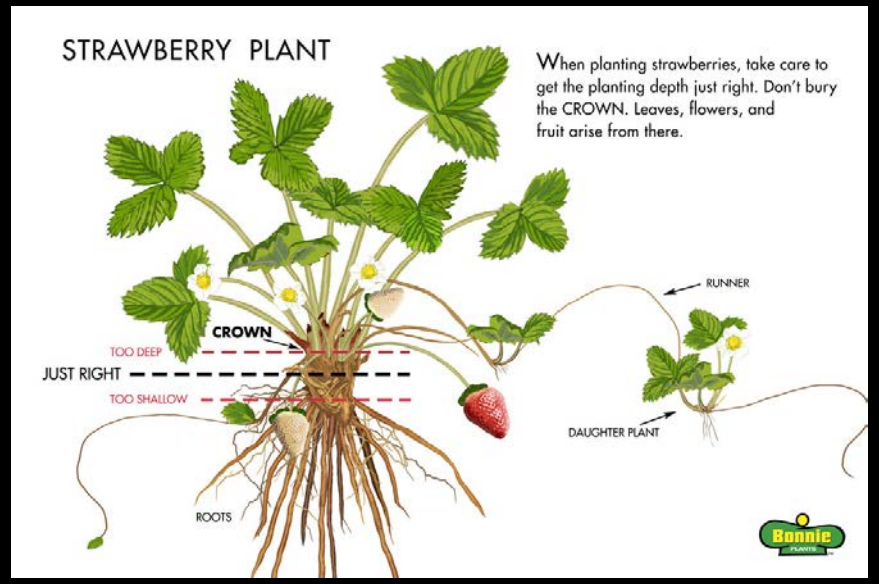

Bonnie Plants image

Planting

Moderately fertile soil – pH 6.5 – 8.0

Well drained soil

Consistent moisture, especially during berry development

Planting depth to mid point of crown

Good soil contact with roots.

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Seascape berries on
Plastic mulch

usberryplants.com

Mulching keeps the berries from soil contact

Straw mulch

Bonnie Plants photo

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Diseases

Diseases (gardener cannot control)

red stele

verticillium wilt

anthracnose

nematodes

www.omafra.gov.on.ca

Solution – select resistant varieties

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Diseases

Diseases (gardener can control)

- powdery mildew
- grey mold
- fruit rots
- crown rots

Solution – Garden management practices

Powdery mildew

www.extension.umn.edu

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Pests

Aphids/mites/weevils/lygus bug/earwigs
Snails/slugs (uncommon in Tahoe/Truckee)
Pill bugs

Rodney Cooper, USDA-ARS

Birds
Mice/squirrels/chipmunks/gophers/rats
Rabbits/raccoons/deer/bear

www.telegraph.co.uk

Solution – Garden management practices

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June Bearing

Early Midseason – Brunswick
Midseason – Flavorfest
Late season – Malwina

Ever-Bearing

Fort Laramie
Mara des Bois

Day neutral

Alpine

Yellow Wonder
(Everbearing)

Photoperiodism (the effects of length of daylight to organisms)*

- For most plants it is the amount of non daylight that affects plant development

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June Bearing Strawberries

Produce a single crop over about a 2 week period

Everbearing strawberries

Produce fruit 2-3 times during the growing season

Day Neutral Strawberries

Produce a few fruit continually during the year

Alpines are everbearing strawberries

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Planning for next year

Consider pinching off most of the flowers the first year

Only keep 1 – 2 daughter plants per parent (stoloniferous)

Pin daughter plants into bare areas within row

Remove most leaves once plant is dormant after several freezes

Remove unproductive plants

Consider mulching for over wintering

Yellow Wonder

Baker Rare Seed photo

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Strawberries grown in
rain gutters

Fertilizing

Prior to planting incorporate a phosphorus based fertilizer (bone meal or equivalent) ½ pound/100 square ft. of bed.

Fertilize with a balanced fertilizer (10-10-10)
1 pound / 100 sq. ft. spring
½ pound / 100 sq. ft. after harvest.

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Michael Wellik of the Strawberry Store

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Suppliers

The Strawberry Store specializes in both *F. vesca and F. moschata,* the musk strawberry.

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Suppliers

Nate, Tim and Mary Nourse

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Fragaria viginiana

Portland Nursery photo

Fragaria chiloensis

Keir Morse photo

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A little history

Greek and Romans report on plant- medicinal

By middle ages grown for berries (*F. vesca*)

New World varieties brought to Europe (1600s)

Crosses of *F. chiloensis and F. virginiana* (1700s)

Hieronymous Bosch painted his Garden of Earthly Delights about 1510

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French King Charles V (Charles the wise) had 1200 strawberries planted into the royal gardens at the Louvre near Paris.

Richard III had a penchant for strawberries, but may have been allergic to them.

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Henry VIII

While Henry VIII greatly enjoyed and popularized strawberries and cream it was Cardinal Wolsey who is credited with inventing the combination

Cardinal Wolsey

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A Short History of the Modern Strawberry – *Fragaria x ananassa*

F. ananassa is a cross between *F. virginiana and F. chiloensis*

Cultivation of Alpine strawberry and Musk strawberry about 1000 AD

AD 916, when Charles III, King of West Francia meets with Cardinal Clemens de Monte Alto (Italy) in Lyons France to resolve a dispute. Following successful negotiations a feast with entertainment was held. A local citizen presents the king and guests with dishes of ripe strawberries, which pleased the Cardinal no end, stating that such fine fruit would be a rarity in Rome, especially so early in the season. In gratitude, King Charles knights the local, changing his name to Fraise (Strawberry in French) and giving him a coat of arms with two diagonal quadrants containing 3 strawberry flowers, the other two having a variation on the crown. The name change was a bit ironic since the newly knighted Sir Fraise name was Julius de Berry.

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A little over a hundred years later members of the Strawberry Clan immigrated to Scotland at the request of the French King, Henry to assist the Scottish King Malcolm III to subdue a renegade noble – Macbeth. The Fraise name was anglicized (or the Scottish equivalent) to Frazer.

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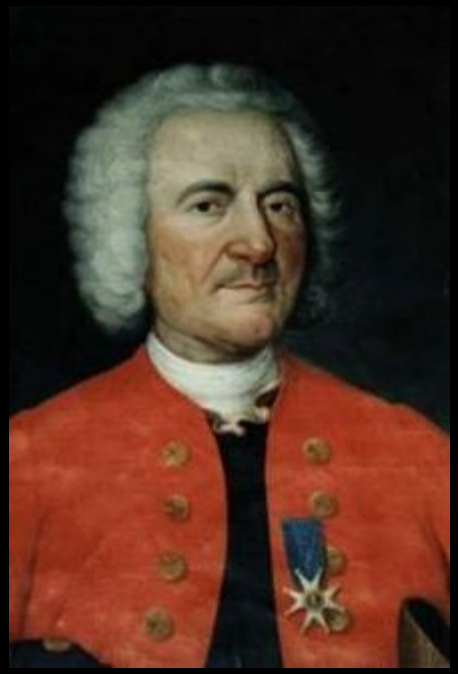

Fast forward a couple hundred years and the politics in Scotland (think Braveheart) get too hot and there is a movement of the Frasers back to France and but now having the French version of Frazer - the name Frézier . Enter one Amédée François Frézier born in 1682 to a prominent lawyer father, he studied both theology and science – and was keen on architecture and fortifications. He also liked to dabble with pyrotechnics.

Perfect qualifications for a French spy, who in 1712 was in Chile to check on Spanish fortifcations.

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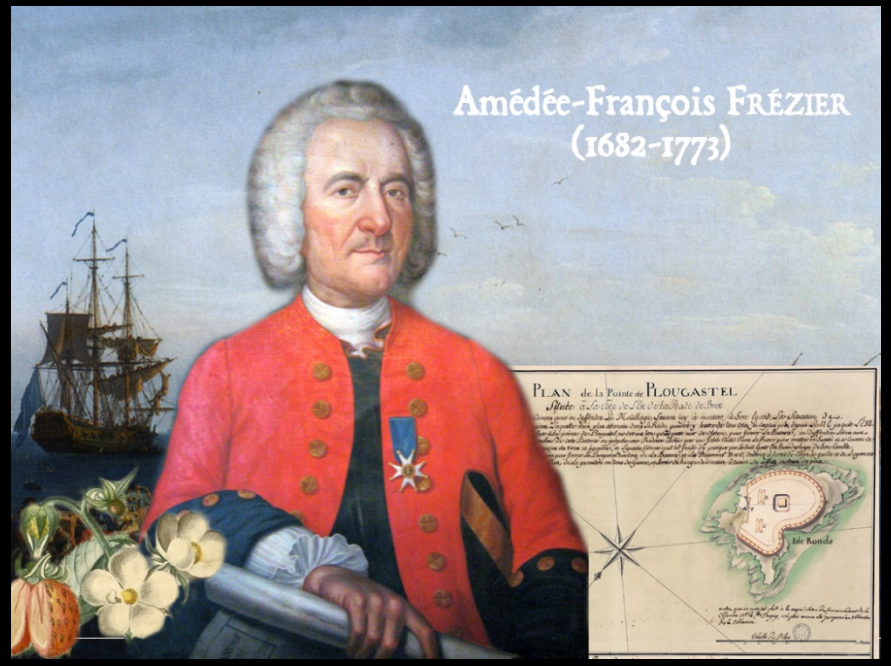

On a tour of the beaches he encountered large fields planted in the beach strawberry (*F. chiloensis*), where he collected a few plants to take with him back to France. His spying was a success, so much so that his Journal was translated into several languages – each a possible enemy of Spain. His five beach strawberry plants became the basis of a number of experimental crosses with European and other strawberries from the New World including *F. virginiana*, which directly led to the modern strawberry we know today.

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Somewhat interestingly, the French approach to hybidization was more academic in their attempts, while the British were driven to commercialization of promising cultivars. As a consequence English varieties were the common market berries in England, the continent and eventually the United States.

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And now this odd story

The *modern strawberry* was introduced to Germany by George II in 1751. George II was king of Hanover (Germany) but was also King of England and Ireland (George II was the last British monarch not born in England and also the last British king to lead troops on the battlefield.

Allan Ramsay artist

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Beginning about 1870 the Goescke father and son team (Gottlieb and Franz) introduced successful German cultivars derived from *F. x ananassa* to the marketplace. Franz was the Royal Horticultural Director at Proskau until about 1912. Their work was followed by Otto Schindler who continued breeding and cultivar introductions until the Nationalist Socialist Party comes to power in 1933.

Autarky

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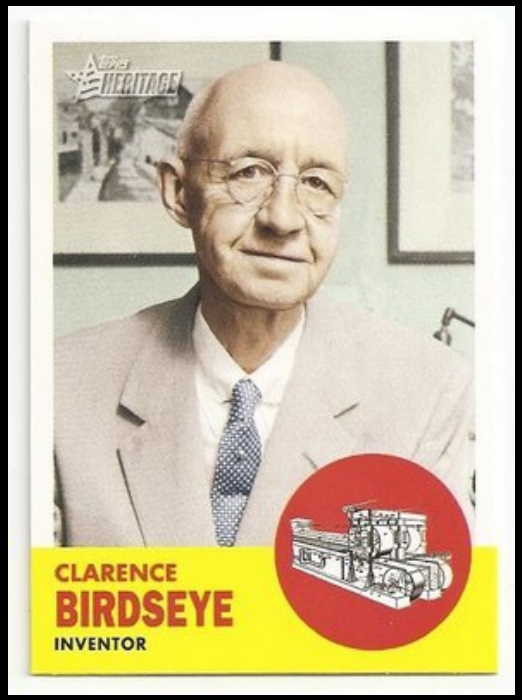
Reinhold Oskar Kurt von Sengbusch

Sengbush a talented botanist, though ambitious, somewhat arrogant, and a difficult person to work with, soon was at odds with his Kaiser-Wilhelm Institute superiors, leaving in 1937 to start a private institute, funded by a tobacco company (through a subsidiary) H.f. & Ph. F. Reemtsma GmbH which had extremely close ties to the Nazi elite.



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Throughout the war years strawberries were grown and cultivars developed at the Sengbusch's institute fields in Luckenwalde. Even as late as 1944-5 strawberry production and research continued with 10,000 seedlings grown and evaluated for both fresh and frozen applications.

The selection of Luckenwalde for field growing was either good planning or luck because a POW prison and an internment camp were there so labor was never an issue for Sengbusch. Even after the Soviets occupied Luckewalde, Sengbush continued his work- but now with oversight by curious Russians who wondered why such importance was given to growing strawberries during a war.

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After the war Sengbush was given a position at the Max Plank Institute of Plant Research (*The new name for the Kaiser-Wilhelm Institute*) where he continued work on Strawberries, very quickly developing one of the most famous European cultivars, the Senga Sengana – all based on his war time research. It was introduced and copyrighted (patented) by Sengbush in 1954.

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In 1954 Sengbusch founded the Sengana GmbH to manage the commercial production and promotion of this cultivar – all while employed at the Max Plank Institute, where he retired from in 1968 (the Max Plank Institute for Plant Breeding closed about the same time).

Senga Sengana strawberry

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What's Inside The Strawberry Patch
Lessons Planning Chart for Strawberry Patch Activities Strawberry Lunch Party Video

United States Department of Agriculture. 2009 revised 2013. The Strawberry Patch. Food and Nutrition Service. https://www.fns.usda.gov/sites/default/files/growit_book7.pdf

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