

CGT LOCKDOWN QUIZ NO. 2

This quiz considers four plant species and the effects of virus infections on them. There's a bit about them, and the people and events connected with them. There's also a bit on viruses generally, and human viral infections. But no mention of you-know-what.

Gin Warren, November 2020

- 1) Biological viruses and computer viruses are the same. True or false?
- 2) Biological viruses were demonstrated in (one answer)
 - 1676 by Antonie van Leeuwenhoek
 - 1847 by Ignaz Semmelweis
 - 1867 by Joseph and Agnes Lister
 - 1892 by Dmitri Ivanovsky
 - 1941 by Florey, Chain, Abraham and Heatly
- 3) Biological viruses (viruses from now on) were discovered using a plant species. Was it (one answer)
 - Chrysanthemum
 - Oak
 - Rye
 - Tobacco plant, or
 - Tulip?
- 4) Viruses are only able to reproduce in the living cells of a host because they don't have the equipment to make new copies of nucleic acids themselves. True or false?
- 5) The effects of tobacco mosaic virus (not the virus itself) were first described in detail by (one answer):
 - Pliny the Elder, who was reminded of tesserae and so gave the problem its name
 - Alexander Neckham, who noted the phenomenon in the gardens at Cirencester Abbey
 - Mary, Duchess of Beaufort, who enjoyed evening walks in the Scented Garden at Badminton
 - The Empress Josephine, who was as interested in promoting the growth of tobacco plants as Napoleon was in sugar beet (see below)
 - Adolf Mayer, a German agricultural chemist working in the Netherlands
 - Christian, Countess Dalhousie, who had learnt to smoke cheroots in India
- 6) Tobacco mosaic virus was the first virus to be crystallised. The full structure of the virus (RNA core and protein coat) was described using X-ray crystallography by (one answer)
 - Marie Curie in 1898
 - Katherine Douty in 1931 (in Cambridge)
 - Rosalind Franklin in 1955



Semper Augustus tulip, the most expensive tulip sold during the 1637 Dutch tulip mania.

- Jocelyn Bell Burnell in 1967 (in Cambridge)

7) Tobacco mosaic virus causes (one or more answers):

- tobacco plant flowers to lose their scent
- the smoked leaves to taste so vile that even hardened smokers give up
- the plants to grow etiolated
- mottling on the leaves
- a very poor germination rate of the seeds.

8) Sugar beet became an economically important crop in Europe because (one or more answers):

- Elizabeth I had found that sweets eased her migraines, so ordered it to be planted instead of woad. She considered woad to be over-rated as she didn't like blue.
- Christian IV promoted it following Denmark's defeat in the Thirty Years War, when the Swedes were stressing him. He sought another root vegetable with which to defy them.
- Building on the work of Antoine-Augustin Parmentier (yes, he of the potato dish!), Napoleon ordered it to be grown to help feed the French population. The Royal Navy was embarrassing him and the French were getting hungry.
- Following Clarkson and Wilberforce achieving their goal of the abolition of slavery, Caribbean production of cane sugar fell but demand for sugar did not.



A sugar beet plant.



Statue to Thomas Clarkson, holding open manacles. He was the anti-slavery campaigner who interested William Wilberforce and supplied him with the information for his speeches in the House of Commons. It is in Wisbech, Clarkson's home town, and was erected in 1881 having been funded by the Peckover family and public subscription. The architect was Sir George Gilbert Scott.

Photo by Antony Warren, 2019.

- 9) Sugar beet yields are reduced by viral infection introduced by aphids. The problem used to be controlled by the use of neonicotinoids but they have been banned. Some low yielding varieties of *Beta vulgaris* are naturally resistant to infection because they have protective genes. These precise mutations could be put into sugar beet varieties that thrive in British conditions. The same effect could be achieved by traditional plant breeding, by back-crossing and selection, but that would take years. Genome editing could achieve it in weeks. True or false?
- 10) Smallpox was a much-feared virus infection. In 1980, the WHO declared it to have been eradicated. Vaccination, a form of immunisation, had been hugely successful. (We older people bear vaccination scars, usually on our upper arms.) These people were involved early on in defeating this virus infection (one or more answers):
- Katerina von Bora aka Frau Luther, a nun who escaped from her convent in a fish delivery cart to join the Reformation, ran the equivalent of a 16C Oxbridge college for her husband in Wittenberg. She acted as both sorts of bursar, chef, bedder, farmer and herbalist as well as mother to the small Luthers. Her saw-wort (*Serratula tinctoria*) was famous for healing the pox - an effect discovered with her neighbour Barbara Cranach when that household all recovered. Katerina had been growing it to supply Barbara who made yellow dye for the illustration business of the Cranach print-shop.
 - Lady Mary Wortley Montagu introduced a (risky) form of immunisation to Britain having lived in Constantinople and seen the use of small doses of live smallpox virus to prevent major infection in the Ottoman Empire.
 - Benjamin Jesty, a Dorset farmer realised that people who worked with cattle and caught cowpox from them didn't get smallpox, so deliberately infected his family with cowpox by vaccinating them. He was vilified, so learned not to talk about it.
 - Edward Jenner, a Gloucestershire doctor, realised that milkmaids who caught cowpox from their cows didn't get smallpox, so vaccinated people and disseminated the idea
 - Antoine-Augustin "Pomme-de-terre" Parmentier (him again!) spent some time as Napoleon's Inspector General of the Health Service and made vaccination compulsory.



Pommes de terre Parmentier

- 11) Introduced by Graeffler in 1783, *Aucuba japonica* was known as the Gold Plant because of the effect of a virus on its leaves. True or false?
- 12) For almost 80 years, nobody in Europe saw an *Aucuba japonica* berry. True or false?



Painting of Acuba japonica by Dutch artist Abrahamus Jacobus Wendel, in H. Witte & A.J. Wendel, 'Flora: afbeeldingen en beschrijvingen van boomen, heesters, eejarige planten, enz. voorkomende in de Nederlandsche tuinen'. Wolyers, 1868.

- 13) What happened in 1861 which meant that by 1864 an aucuba with berries could cause a sensation in Kensington (one answer)?
- The particular type of solitary bee which pollinates aucubas was accidentally introduced to Europe in a Wardian case.
 - Robert Fortune found a male plant in Yokohama and had it sent back to Surrey. At last - aucubas no longer had to be celibate in the west! (Graeffe's plants were all female.)
 - Paper ceased to be taxed. Gardening books and periodicals became cheaper so advice about keeping aucubas properly could be thoroughly disseminated.
- 14) While we're thinking about him, let's consider Graeffe's later career. Having trained with Miller at Kew and worked with Brown at Croome Court, Vere at Kensington Gore and at Mile End Nursery in Stepney, in 1799 he became bailiff of Nelson's estate on Sicily. This was on the recommendation of (one answer)?
- The Queen of Naples (she liked the 'English Garden' he had made for her in Naples)
 - Sir William Hamilton
 - Emma, Lady Hamilton
 - Thomas Masterman Hardy (he of the kiss)
 - The Empress Josephine (a fellow rose enthusiast)
 - Biddy Brown (dear Lancelot had spoken well of him)
 - Barbara, Lady Coventry (because he'd said nice things about her folly, Broadway Tower)



Castello Nelson at Bronte, Catania, nestles in the foothills of Etna.

- 15) In 1891, Rev. W. Wilks, Secretary of the RHS, said of *Aucuba japonica* (one answer):
- “Mr Holmes, someone keeps sending me aucuba leaves in the post perforated with a mysterious design!”
 - “You can hardly have too much of it!”
 - “But, Bishop, am I really so proud of them that it is a sin?”
 - “Can no-one rid me of this troublesome plant?”
 - “Are aucuba berries poisonous to Spaniels? Or has Bonzo been at the Shirley Poppies?”

16) Robert Fortune spent little time in Japan. He was better known for his plant hunting in (one answer)?

- East coast of North America
- South America
- The Himalayas
- China
- South Africa



Fortune's family grave in Brompton Cemetery; previously a market garden.

17) A plant species famously affected

- by viruses was central to the plot of a full-length thriller by (one answer):
- Mary Elizabeth Braddon
 - Wilkie Collins
 - Arthur Conan Doyle
 - Alexander Dumas
 - Jane Loudon

18) How many virus types infect tulips? (one answer)

- 1-3 inclusive
- 4-6
- 7-9
- 9-12
- >12?

19) Tulipomania in the Netherlands was driven by Tulip Breaking Virus. The effects were not stable, and infection weakened the plants. The collapse happened in (one answer)?

- November 1636
- December 1636
- January 1637
- February 1637
- March 1637



Wagon of Fools by Hendrik Gerritsz Pot, 1637. Followed by Haarlem weavers, Flora the goddess of flowers rides to destruction in the sea accompanied by tipplers, money-changers and the two-faced goddess Fortune.

20) At the same time as TBV associated tulip speculation was rife, the citizens of Haarlem and the surrounding area were suffering from a bacterial infection which may have had a role in the collapse, in that potential buyers lost interest in travelling to/ being in that area of the Netherlands. It was due to (one answer)?

- E. coli
- S. enterica
- S. pyogenes
- V. cholerae
- Y. pest

There we are: twenty questions that we hope will fill a quiet time with some fun and a challenge. If you can't wait to find out the answers then please go to the CGT website and download the [answers](#) (click the blue underlined link or copy and paste the following into your browser)

<https://cambridgeshiregardenstrust.files.wordpress.com/2020/11/virusquizanswers.pdf>

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