= Great French Wine Blight =

The Great French Wine Blight was a severe blight of the mid @-@ 19th century that destroyed many of the vineyards in France and laid waste to the wine industry . It was caused by an aphid (the actual genus of the aphid is still debated , although it is largely considered to have been a species of Daktulosphaira vitifoliae , commonly known as grape phylloxera) that originated in North America and was carried across the Atlantic in the late 1850s . While France is considered to have been worst affected , the blight also did a great deal of damage to vineyards in other European countries .

How the Phylloxera aphid was introduced to Europe remains debated : American vines had been taken to Europe many times before , for reasons including experimentation and trials in grafting , without consideration of the possibility of the introduction of pestilence . While the Phylloxera was thought to have arrived around 1858 , it was first recorded in France in 1863 , near the former province of Languedoc . It is argued by some that the introduction of such pests as phylloxera was only a problem after the invention of steamships , which allowed a faster journey across the ocean , and consequently allowed durable pests , such as the Phylloxera , to survive .

Eventually , following Jules @-@ Émile Planchon 's discovery of the Phylloxera as the cause of the blight , and Charles Valentine Riley 's confirmation of Planchon 's theory , Leo Laliman and Gaston Bazille , two French wine growers , proposed that the European vines be grafted to the resistant American rootstock that were not susceptible to the Phylloxera . While many of the French wine growers disliked this idea , many found themselves with no other option . The method proved to be an effective remedy . The " Reconstitution " (as it was termed) of the many vineyards that had been lost was a slow process , but eventually the wine industry in France was able to return to relative normality .

= = Background = =

The aphid that was the central source of the damage in France was first noted following the growing of the European vine Vitis vinifera by French colonists in Florida , in the 16th century . These plantations were a failure , and later experiments with related species of vine also failed , although the reason for these failures appears to have been a mystery to the French colonists . It is known today that it was a species of North American grape phylloxera that caused these early vineyards to fail ; the venom injected by the Phylloxera causes a disease that is quickly fatal to the European varieties of vine . The aphids initially went unnoticed by the colonists , despite their great numbers , and the pressure to successfully start a vineyard in America at the time .

It became common knowledge among the settlers that their European vines , of the vinifera. variety , simply would not grow in American soil , and they resorted to growing native American plants , and established plantations of these native vines . Exceptions did exist ; vinifera plantations were well @-@ established in California before the aphids found their way there .

= = = Phylloxera = = =

There have been several theories proposed for why the phylloxera was ignored as the possible cause of the disease that resulted in the failure of so many vineyards , most of which involve the feeding behaviour of the insect , and the way it attacks the roots . The proboscis of the grape phylloxera has both a venom canal from which it injects its deadly venom and a feeding tube through which it takes in vine sap and nutrients . As the toxin from the venom corrodes the root structure of a vine , the sap pressure falls and , as a result , the Phylloxera quickly withdraws its feeding tube and searches for another source of food . Thus , anyone digging up a diseased and dying vine will not find Phylloxera clinging to the roots of the plant .

= = = Journey to Europe = = =

For a few centuries , Europeans had experimented with American vines and plants in their soil , and many varieties were imported from America without regulation , disregarding the possibility of pest transfer , and related problems . Jules @-@ Emile Planchon , a French biologist , who identified the Phylloxera in the 1860s , maintained that this transfer of American vines and plants into Europe greatly increased between roughly 1858 and 1862 , and this is how the Phylloxera was accidentally introduced to Europe around 1860 , although the aphid did not enter France until around 1863 . It is believed that the advent of steamships was a factor as well , as the ships were faster , and the Phylloxera were able to survive the quicker ocean voyage .

= = The blight = =

= = = Initial appearance = = =

The first known documented instance of an attack by the Phylloxera in France was in the village of Pujaut in the department of Gard of the former province of Languedoc , in 1863 . The wine makers there did not notice the aphids , just as the French colonists in America had not , but they noted the mysterious blight that was damaging their vines . The only description of the disease that was given by these wine growers was that it ' reminded them distressingly of " consumption " ' (tuberculosis) . The blight quickly spread throughout France , but it was several years before the cause of the disease was determined .

= = = Damage = = =

Over 40 % of French grape vines and vineyards were devastated over a 15 @-@ year period , from the late 1850s to the mid @-@ 1870s . The French economy was badly hit by the blight ; many businesses were lost , and wages in the wine industry were cut to less than half . There was also a noticeable trend of migration to , among other places , Algiers and America . The production of cheap raisins and sugar wines caused problems for the domestic industry that threatened to persist even after the blight itself . The damage to the French economy , is estimated to have been slightly over 10 billion Francs .

= = = Discovery = = =

Research into identifying the cause of the disease began in 1868 , when grape growers in Roquemaure , near Pujaut , asked the agricultural society in Montpellier for help . To investigate the disease , the society appointed a committee consisting of botanist Jules Émile Planchon , local grower Felix Sahut , and the society 's president , Gaston Bazille , among others . Sahut soon noticed that the roots of dying vines were infested with " lice " , which were sucking sap from the plants . The committee named the new insect Rhizaphis vastatrix . Planchon consulted French entomologists Victor Antoine Signoret and Jules Lichtenstein (Planchon 's brother @-@ in @-@ law) . Signoret suggested renaming the insect Phylloxera vastatrix , due to its similarity to Phylloxera quercus , which afflicted oak leaves . In 1869 , English entomologist John Obadiah Westwood suggested that an insect that had afflicted grape leaves in England circa 1863 was the same insect afflicting grape vines ' roots in France . Also in 1869 , Lichtenstein suggested that the French insect was an American " vine louse " that had been identified in 1855 by the American entomologist Asa Fitch , which he 'd named Pemphigus vitifoliae . However , there was a problem with these suggestions : French grape lice were known to infest only a vine 's roots , whereas American grape lice were known to infest only its leaves . The British @-@ born American entomologist Charles Valentine Riley had been following news of the outbreak in France . He sent Signoret specimens of American grape lice , which Signoret concluded ? in 1870 , while besieged in Paris during the Franco @-@ Prussian War ? were indeed identical to French grape lice . Meanwhile , Planchon and Lichtenstein had found vines with afflicted leaves ; lice that were

transferred from those leaves to the roots of healthy vines attached themselves to the vines ' roots as other French grape lice did . Also in 1870 , Riley discovered that American grape lice wintered on American grape vines ' roots , which the insects damaged , albeit less than in the case of French vines . Using American grape vines and American grape lice , Riley also repeated Planchon and Lichtenstein 's experiment , with similar results . Thus the identity of the French and American grape lice was proved . Nevertheless , for another three years , a powerful majority in France argued that Phylloxera was not the cause of vine disease ; instead , vines that were already sickly became infested with Phylloxera . Thus , in their opinion , Phylloxera was merely a consequence of the " true " disease , which remained to be found . Regardless , Riley had discovered American grape varieties that were especially resistant to Phylloxera , and by 1871 , French farmers began to import them and graft French vines onto the American rootstock . (Leo Laliman had suggested importing American vines as early as 1869 , but French farmers were reluctant to abandon their traditional varieties . Gaston Bazille then proposed grafting traditional French vines onto American rootstock .) However , importation of American vines did not entirely solve the problem : some American grape varieties struggled in France 's chalky soils and succumbed to Phylloxera . By trial and error , American vines were found that could tolerate chalky soils . Meanwhile , entomologists worked to unravel the strange life cycle of Phylloxera , a project that was completed in 1874 .

= = = Solution = = =

Many growers resorted to their own methods in attempt to resolve the issue . Chemicals and pesticides were used to no avail . In desperation , some growers positioned toads under each vine , and others allowed their poultry to roam free in the hope they would eat the insects . None of these methods were successful .

After Charles Valentine Riley , Missouri 's state entymologist , confirmed Planchon 's theory , Leo Laliman and Gaston Bazille , two French wine growers , both suggested the possibility that if vinifera vines could be combined , by means of grafting , with the aphid @-@ resistant American vines , then the problem might be solved . Thomas Volney Munson was consulted and provided native Texan rootstocks for grafting . Because of Munson 's role , the French government in 1888 sent a delegation to Denison to confer on him the French Legion of Honor Chevalier du Mérite Agricole .

The method was tested , and proved a success . The process was colloquially termed " reconstitution " by French wine growers . The cure for the disease caused a great division in the wine industry : some , who became known as the " chemists " , rejected the grafting solution and persisted with the use of pesticides and chemicals . Those who became grafters were known as " Americanists " , or " wood merchants " . Following the demonstrated success of grafting in the 1870s and 1880s the immense task of " reconstituting " the majority of France 's vineyards began .

= = = = Prize = = = =

The French government had offered over 320 @,@ 000 Francs as a reward to whoever could discover a cure for the blight . Having reportedly been the first to suggest the possibility of using the resistant American rootstock , Leo Laliman tried to claim the money , but the French government refused to award it , with the rationale that he had not cured the blight , but rather stopped it from occurring . However , there may have been other reasons for the government denying Laliman the prize : he was mistrusted by several notable parties , and he was thought by many to have originally introduced the pest .

= = Present day = =

There is still no remedy , as such , for the Phylloxera , or the disease it brings with it , and it still poses a substantial threat to any vineyard not planted with grafted rootstock . In fact , there is only one European grape vine known to be resistant to the Phylloxera , the Assyrtiko vine , which grows on the volcanic Greek island of Santorini ; however there is speculation that the actual source of this

resistance may arise from the volcanic ash in which the vines grow , and not from the vine itself .

The events of the Great Wine Blight , and the need for European @-@ American grafting has given rise to a debate that remains unresolved today : whether self @-@ rooted vines produce better wine than those that are grafted .

There still exist some vines which have been neither grafted nor destroyed by phylloxera , including some owned by Bollinger .