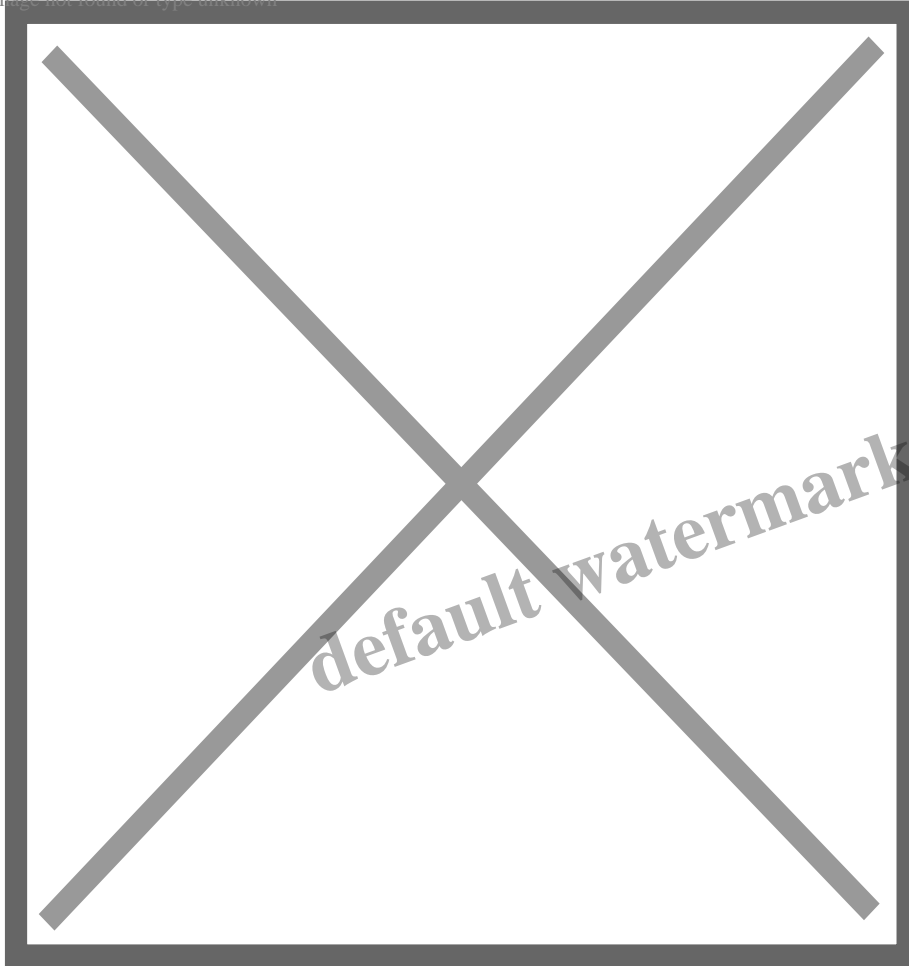


Guitars, bugs and climate change – Fender and the Emerald Ash Borer

Description

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Emerald Ash Borer beetle and my red Fender American Deluxe Stratocaster (Beetle image from: www.arborday.org)

The ash trees that produce Fender’s iconic Telecasters and Stratocasters are being threatened by an invasive beetle and changing rainfall and flooding regimes.

My Strat

Like many folks, [my first guitar](#) was terrible. A no-name acoustic with a narrow neck and ridiculously high action. I got as a present from my mum when I was in high school. I had a few other guitars after that, mostly \$10 numbers from pawn shops and charity stores.

It was only when I was heading towards 60 that I got my first “nice” guitar – a red 2013 Fender American Deluxe Stratocaster. I knew remarkably little about guitars at the time, but I knew about

Stratocasters. If Clapton, Hendrix, Knopfler and all those other guys played them, then this was obviously the guitar for me. It was a beauty. And it had control knobs that actually worked and was incredibly easy to play because it was properly set up with a nice low action. Sadly, of course, it didn't magically make me play like Clapton, Hendrix or Knopfler – but at least it made practicing a bit easier.

I didn't know it at the time, but the American Deluxe had a body made from ash wood and a neck and fretboard made of maple. I'll return to this shortly, but first of all a bit of background on Fender.

A quick look at Fender's history

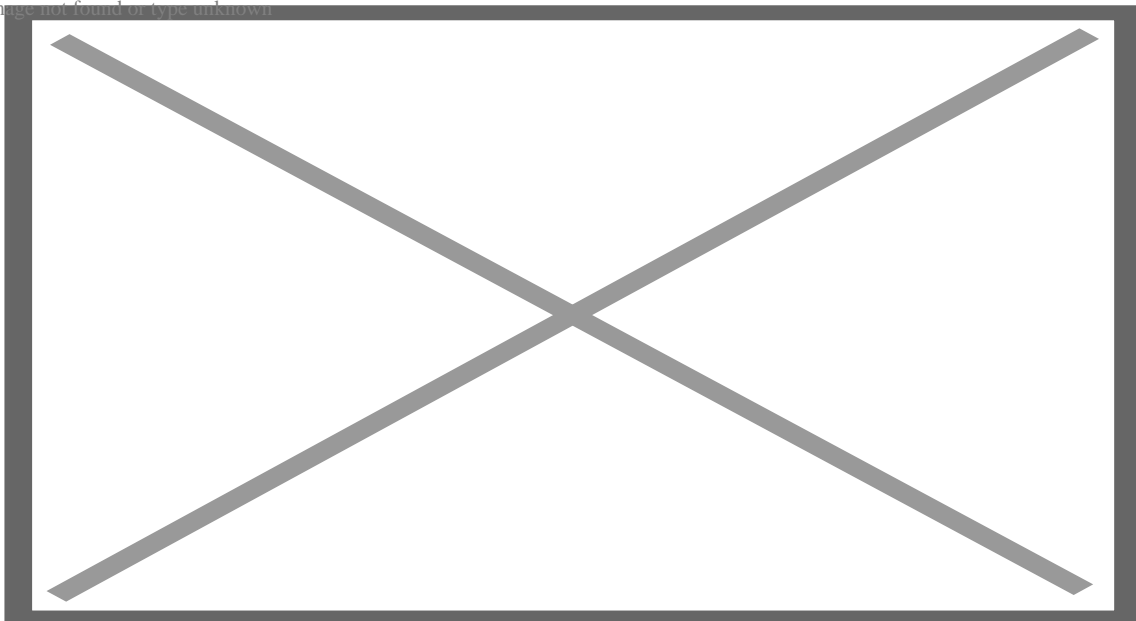
A few months ago, I wrote a series of posts on various aspects of Gibson Guitars, including their [chequered history of sustainable wood use](#), the story of the [Kalamazoo Girls](#), and the impact of [increasingly corporate management styles on the company](#).

I hadn't set out to pursue all of these avenues, but digging into the research for the first story led to further interesting leads worth following – [plenty rabbit holes to go down](#).

In the world of electric guitars, Fender is probably Gibson's major rival. I found it interesting that it was relatively easy to dig up all sorts of stuff about Gibson's behaviour over the years, but that relatively little popped up about Fender.

The two companies have very different histories, and both certainly played major parts in the development of the electric guitar. As we saw in [an earlier post](#), Gibson started out early in the 20th century making primarily mandolins and archtop guitars. [Fender](#) started life as the Fender Electric Instrument Company in 1946, based in Fullerton, California. The company was founded by [Leo Fender](#), who had started out with a radio repair shop in 1938 and went on to design and build PA systems, amplifiers and then electric guitars.

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Leo Fender (Source: [MusicZoo](#))

Initially these were mostly Hawaiian-style lap steel guitars, but Fender was persuaded to design a standard solid-body electric guitar – something that was already being trialled effectively by others, including [Les Paul](#), [Paul Bigsby](#), [Adolph Rickenbacher](#) and [George Beauchamp](#).

Fender was not a guitar player – while this might be seen as a disadvantage for someone wanting to design guitars, it in fact allowed Fender to “think outside the box”. His experience with guitar players during the years he rented and sold PA systems told him that working musicians would appreciate instruments that were both inexpensive and easy to maintain and repair.

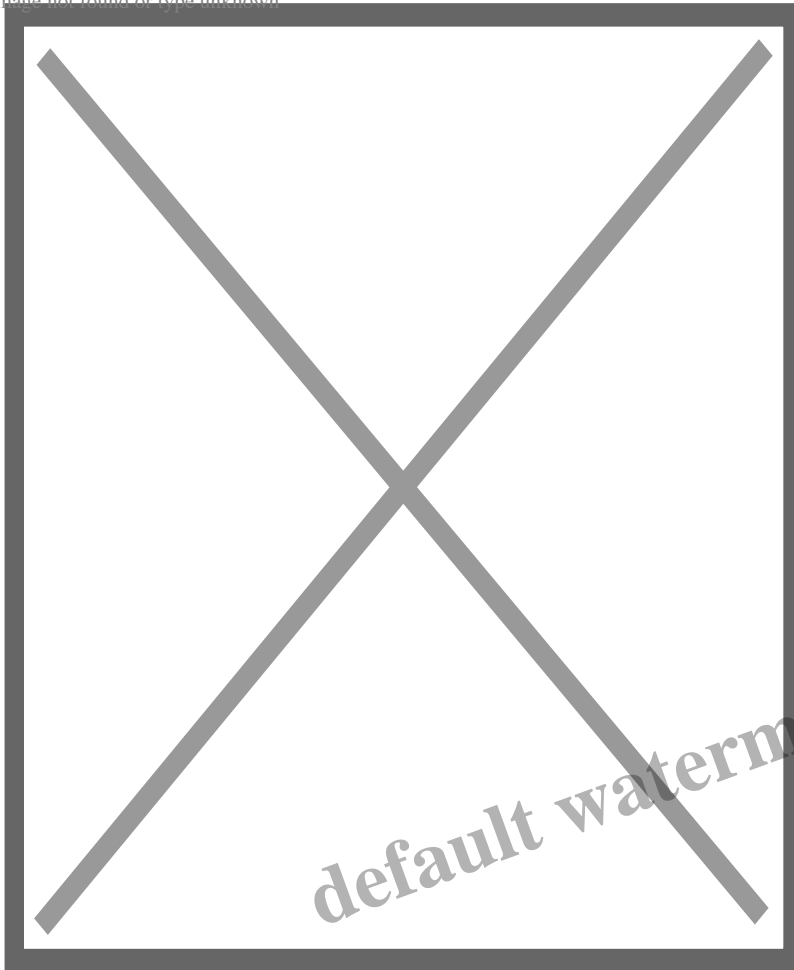
The Telecaster and Stratocaster

Fender’s first solid body electric was launched in 1950 – named the Fender Esquire, it morphed to become the Broadcaster and subsequently the [Telecaster](#). The design was simple, geared to enable mass production, and the result was a guitar that immediately appealed to a growing number of players. The Telecaster remains popular to this day, and the basic design remains pretty much the same as it was back in the 1950s.

Meanwhile, Gibson, who had earlier shunned the idea of producing a solid body electric, saw that they were being left behind. This was when they contacted Les Paul, who had been trying to interest them in the idea for a while. The Gibson Les Paul Gold Top was introduced in 1952.

Leo Fender had also tried to get Les Paul to join forces with Fender, but it’s assumed that Les Paul preferred the more traditional approach of Gibson. Fender responded to the Gibson Les Paul with a new design that was meant to replace the Telecaster. A team effort resulted in the design of the Fender [Stratocaster](#). Launched in 1954, this guitar featured many revolutionary aspects, including its contoured “space-age” body and combination of pickups and controls.

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Dave Hunter's 2020 [book](#) on the Telecaster and Stratocaster

And the rest is history. The Stratocaster has become probably the most popular – and the most copied – guitar in the world. It never did completely replace the Telecaster though, with an ongoing demand for this guitar as well. Both have been in constant production since their inception – and the basic design remains pretty much the same as it was back in the 1950s.

Losing and regaining Fender's soul

In early 1965, Leo Fender [sold his company](#) to the Columbia Broadcasting System (CBS).

The “pre-CBS era” is viewed by many as the time Fender produced its best guitars. CBS was a large corporation – and, as we've seen with Gibson, corporate perspectives tend to put profits first, and the quality of guitars declined as emphasis shifted to greater mass-production. Some would go as far as to say that Fender lost its soul during the CBS era.

Unlike Gibson, Fender did not carry on down an increasingly corporatized track. In 1985, CBS Musical Instruments division president William Schultz initiated a process of turning Fender away from the corporatized trends of the previous decades. Fender employees purchased the company from CBS and renamed it Fender Musical Instruments Corporation (FMIC).

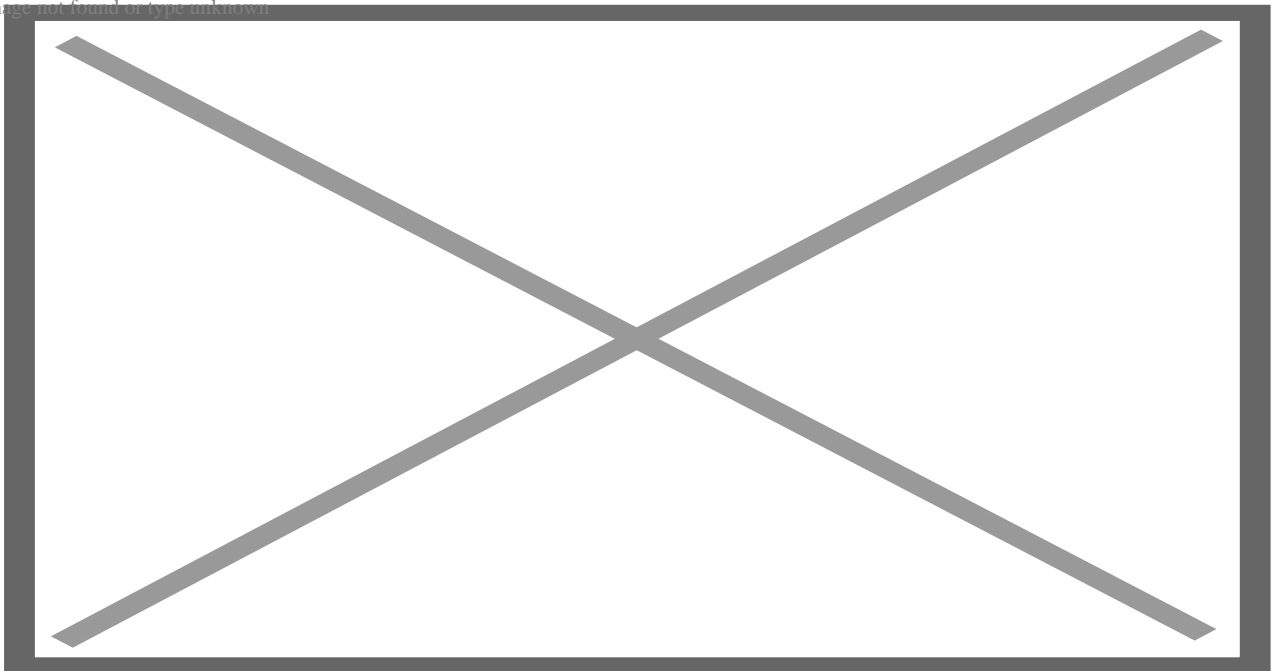
This put Fender back in the hands of a small group of dedicated people committed to regaining the prior reputation – by committing to the creation of great quality instruments. Much in the same way as Heritage Guitars aimed to continue the tradition of Gibson Guitars in the Kalamazoo factory, a core group of employees, dealers and suppliers set out to restore Fender’s previous quality and status.

They had to start from scratch though. The former Gibson employees had to find a new name for their company, but remained in the old Kalamazoo factory with a lot of the old Gibson machinery. The Fender employees got to keep the name but nothing else — the Fullerton buildings and machinery were not included in the sale. FMIC had to build a new factory in the nearby town of Corona.

While the factory was being built, Fender sold only instruments made overseas, but from 1985 instruments started flowing out of Corona. A second factory opened in Ensenada, Mexico in 1987, and the company moved its headquarters to Scottsdale, Arizona in 1991. Fender was well on the road back to respectability and prosperity, and has not really looked back since.

The company seems to have avoided the mistakes that have plagued Gibson in recent decades. Indeed, it seems to have made copy-book decisions based on solid market research and respect for its existing and emerging customer base. In a 2018 article titled [“Gibson’s Bankruptcy is a Cautionary Tale about Corporate Innovation”](#), Matt LeMay suggested that “...while Gibson was dismissing and name-calling their customers, Fender was actually listening to their customers. And the things they heard challenged some very fundamental assumptions about what they were selling, and who was buying it.”

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Fender realised that its customer profile was changing and geared its advertising more to a younger audience and women, and less to portraying ageing rock legends. (Source: [Fender](#))

Gibson v Fender

In the book, “The Birth of Loud: Leo Fender, Les Paul, and the Guitar-Pioneering Rivalry That Shaped Rock ‘n’ Roll” Ian Port follows the story of the development of the electric guitar and the growing rivalry between the two main companies involved.“

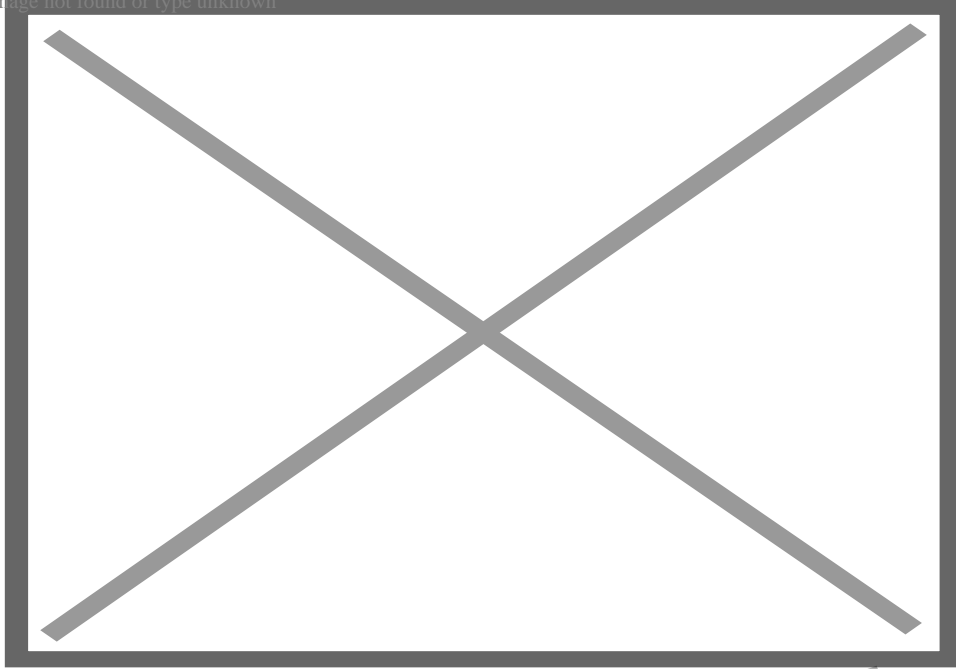
In the years after World War II, music was evolving from big-band jazz into rock ‘n’ roll—and these louder styles demanded revolutionary instruments. When Leo Fender’s tiny firm marketed the first solid-body electric guitar, the Esquire, musicians immediately saw its appeal. Not to be out-maneuvered, Gibson, the largest guitar manufacturer, raced to build a competitive product. The company designed an “axe” that would make Fender’s Esquire look cheap and convinced Les Paul—whose endorsement Leo Fender had sought—to put his name on it. Thus was born the guitar world’s most heated rivalry: Gibson versus Fender, Les versus Leo.

While Fender was a quiet, half-blind, self-taught radio repairman, Paul was a brilliant but headstrong pop star and guitarist who spent years toying with new musical technologies. Their contest turned into an arms race as the most inventive musicians of the 1950s and 1960s—including bluesman Muddy Waters, rocker Buddy Holly, the Beatles, Bob Dylan, and Eric Clapton—adopted one maker’s guitar or another. By 1969 it was clear that these new electric instruments had launched music into a radical new age, empowering artists with a vibrancy and volume never before attainable.”

[“The Birth of Loud: Leo Fender, Les Paul, and the Guitar-Pioneering Rivalry That Shaped Rock ‘n’ Roll” 2019 By: Ian S. Port](#)

The discussion around [which is better](#) – a Fender or a Gibson – continues unabated today. You can find any number of articles and videos comparing every aspect of the guitars and any number of opinions on why, for instance, a Gibson Les Paul is better than a Fender Strat or vice versa.

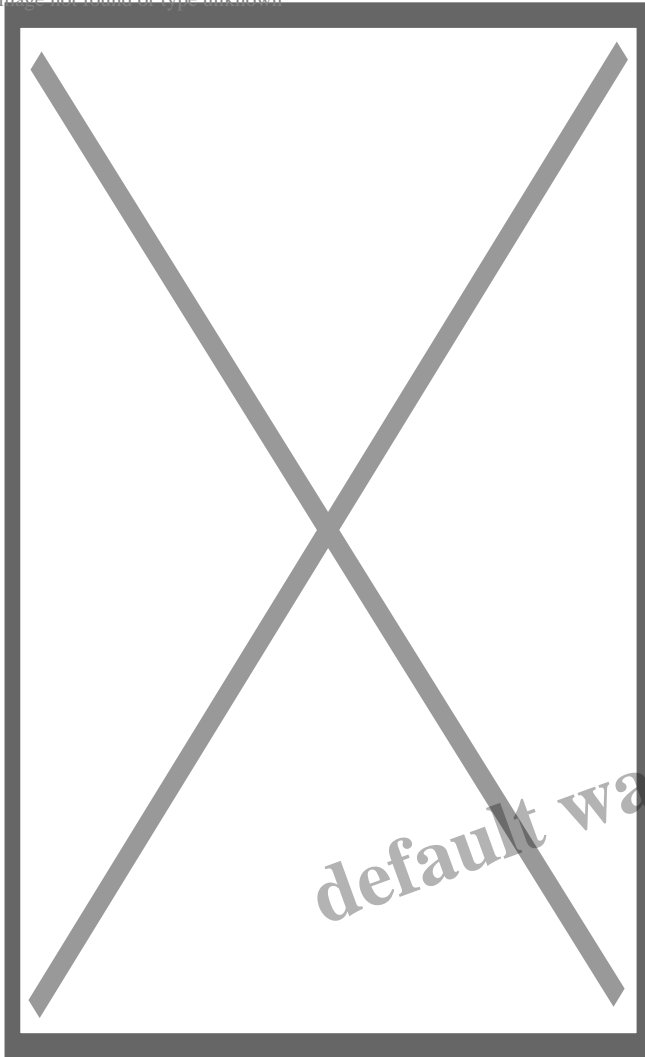
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Source: [Meme](#)

As with everything to do with guitars, the answer is probably that neither is “better”, [just different](#). A Les Paul and a Strat certainly feel, look, sound and play very differently because they have many characteristics that set them apart. Some people prefer the sound and feel of a Les Paul over a Strat. Some people, me included, like both!

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Fender Stratocaster and Gibson Les Paul (Source: [ModernMojo](#))

Of course, there is a huge amount of variation within individual models in terms of their physical and electronic characteristics. Guitars from different years of production, made in different factories and with different configurations are all likely to be different products – and the difference can be subtle or obvious. Direct comparisons between a Les Paul and a Strat need some control over what’s being compared to what. And you can have as much fun comparing different Les Pauls or different Strats.

Wood for Fender guitars

One feature that is strikingly different between the main Gibson and Fender solid body models is the types of wood used. Gibson tended to use traditional woods such as mahogany for their guitars – the solid bodies were no exception, with a standard Les Paul consisting of a solid mahogany body with a maple top. Much of the wood Gibson used grew elsewhere, particularly in the tropics, and had to be imported. As tropical wood grew harder to get because of declining forests and tighter trade restrictions, Gibson’s approach was to find new sources rather than to switch woods. We saw in [another post](#) how the company got itself into trouble by not following the relevant import restrictions

From the outset, however, Leo Fender decided to use mostly wood that was abundant and readily available within North America. Some guitars feature rosewood fretboards, and Fender [acoustic guitars](#) use a variety of different woods. However, the woods most used in Telecasters and Stratocasters were, from the outset, ash or alder for the body and maple for the neck and, often, the fretboard. All common trees in the US and none under threat of over-exploitation.

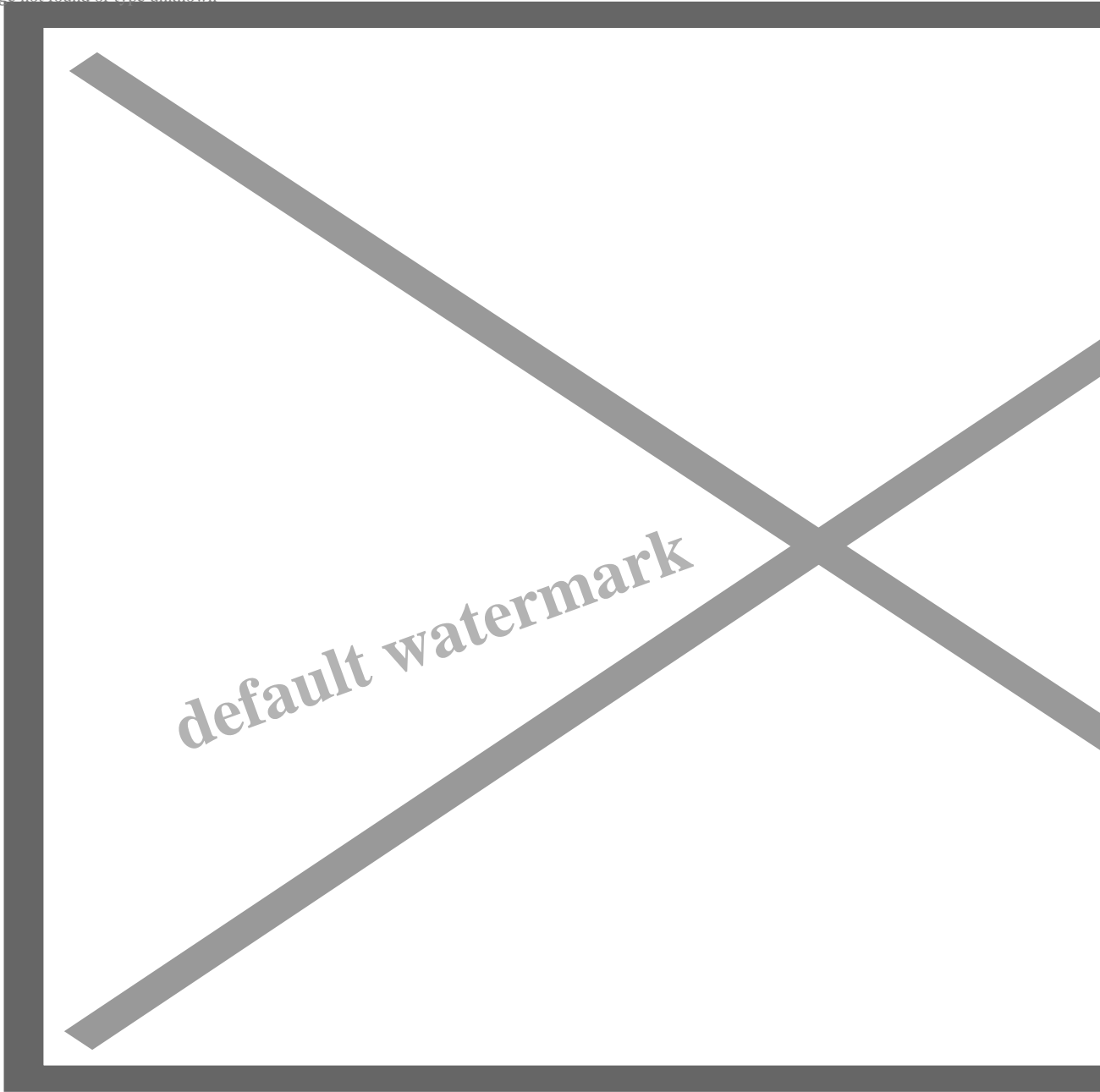
Chris Gibson and Andrew Warren in their book "[The Guitar: Tracing the Grain Back to the Tree](#)", travelled to Fender's factory in California and met Mike Born, Fender's "wood guy". Mike had this to say about the woods used in Fender guitars: "We were fortunate that the old Fender designs used very easy-to-get American woods. Leo Fender was a very economical kind of guy looking to make inexpensive instruments, and developed them. around those woods. They weren't used for other things. Swamp ash is a good example: it was a throwaway product from furniture wood. Alder, same thing. At that point, it was just upholstered furniture wood. Most of Fender's guitars still use plentiful and unpretentious timbers: ash, alder, and maple."

Being a plant nerd as well as a guitar geek, I wanted to find out more about the particulars of these trees. As usual, nothing is simple, and it takes a bit of detective work to find out which particular species produce the guitar woods.

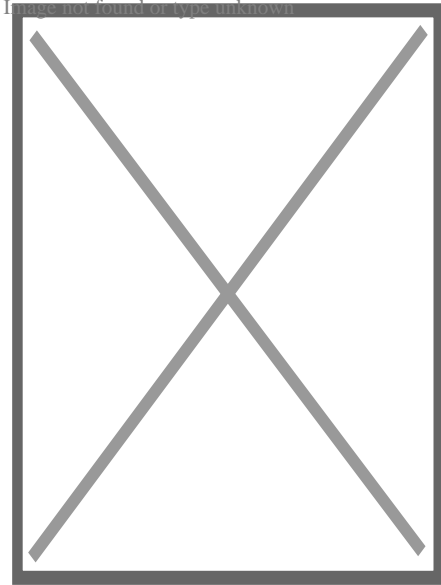
Ash, alder and maple

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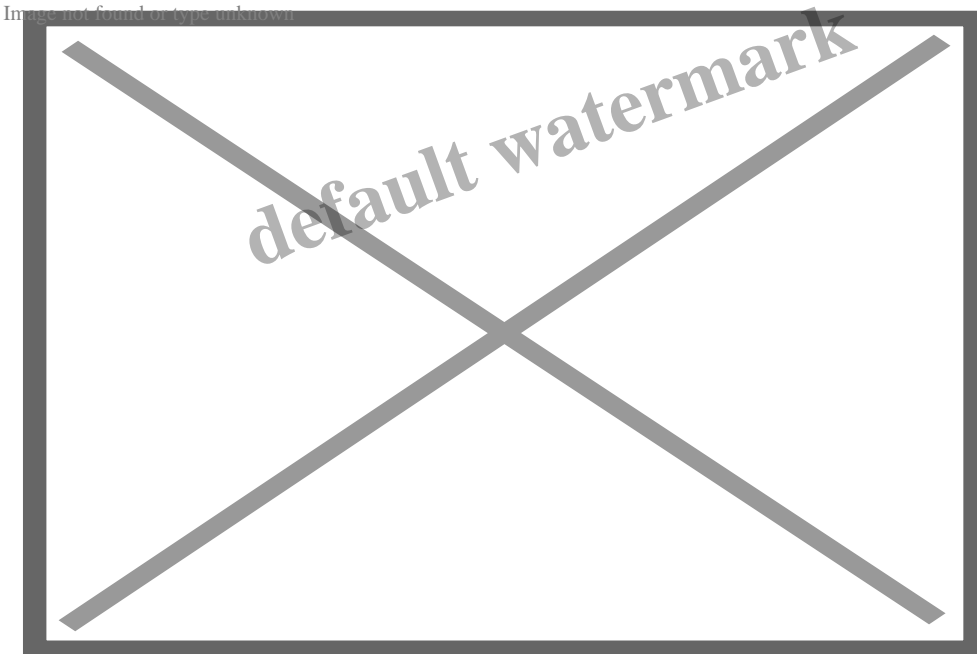
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Ash



Alder



Maple

Sources: [Homestratosphere](#), [NativeplantsPNW](#), [Countrytreeservice](#)

There are about 35 species of [Alder](#), but the one used most by Fender is [red alder](#), *Alnus rubra*, which grows near the Pacific coast from Alaska to California and can reach 30m in height. Following Leo Fender's aim to use local easy-to-source woods, the choice of red alder [makes sense](#).

Over 130 species of [maple](#) exist worldwide. Maple is used in a variety of musical instruments, including violins and cellos. Different species are used for different parts of guitars. Sugar maple [Acer saccharum](#), sometimes called hard maple, is used for [necks and fretboards](#). It grows plentifully in eastern North America and produces a hard wood that Leo Fender identified early as ideal for guitars. Black maple *Acer nigrum*

is similar and sometimes lumped with, or called a subspecies of, sugar maple (the two species hybridize anyway).

There are 60-65 species of [ash](#) (*Fraxinus*) around the world, and a dozen or so are common in North America – a nice guide to the main species can be found [here](#). The Ash associated most regularly with guitars is often called Swamp Ash, but this may refer to [several different species](#) – mainly [Fraxinus caroliniana](#), or [F. pennsylvanica](#) (green ash), but also sometimes white, black and European ash (*Fraxinus americana*, *F. nigra*, and *F. excelsior*). *Fraxinus caroliniana* is found across southeastern parts of the US. Green ash, on the other hand, extends further north in eastern and central North America.

Ash wood varies significantly in its characteristics, and guitar makers differentiate the wood based on how heavy it is. Lighter wood from Swamp Ash is often favoured, and tends to come from the lower parts of trees growing in wet areas. It's probable that Leo Fender started using this wood for guitar bodies because it was considered poor quality for other purposes. It's certainly the wood associated with classic 1950s Fender guitars. And it makes them much lighter than the equivalent Gibson Les Pauls.

Ash or Alder?

Fender started out using mostly ash for the new electric guitars but also introduced alder as an alternative from the late 1950s onwards.

Ash

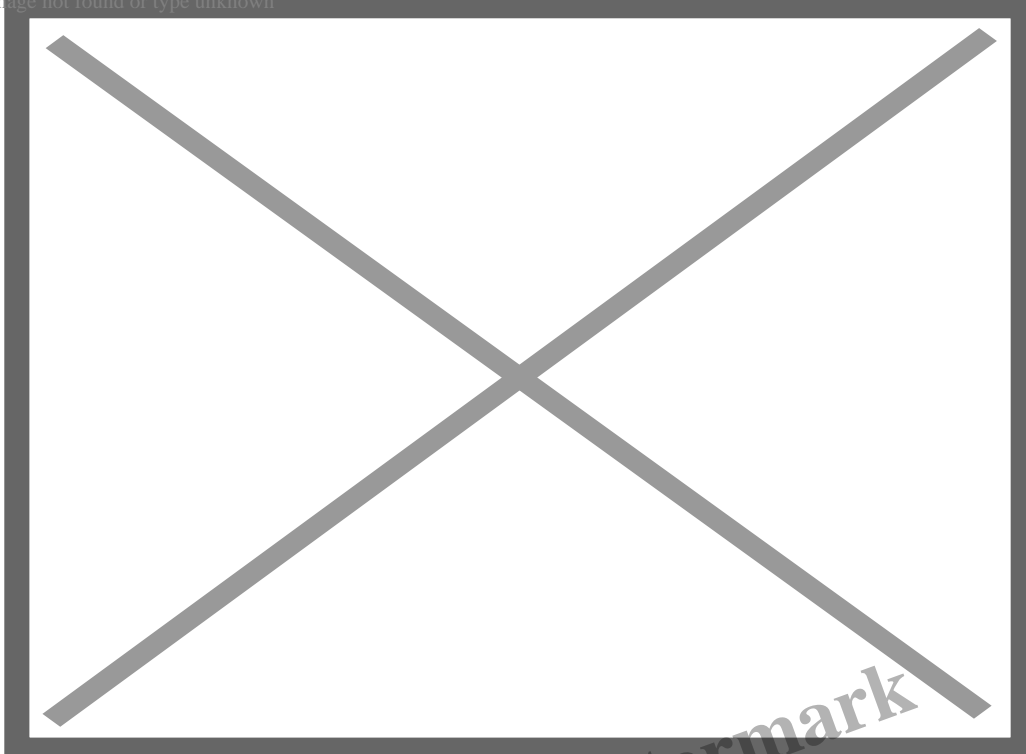
Good swamp ash is both light and resonant, and generally carries a broad grain that looks great under a translucent finish. The swamp-ash sound is twangy, airy, and sweet. It offers firm lows, pleasant highs, a slightly scooped midrange, and good sustain. Ash from the upper portions of the tree has also been used, as has harder northern ash. Both tend to be denser and heavier, and have a brighter, harder sound that might be more useful when cutting, distorted tones are desired.

Alder

Alder has a strong, clear, full-bodied sound, with beefy mids and excellent lows. Its highs sizzle slightly, but are rarely harsh, and it offers a decent amount of sustain. Slightly brownish in its natural, dried state, alder's grain isn't necessarily unattractive, but it usually isn't particularly interesting, either. It is typically used under opaque finishes, but some examples can look good under darker translucent finishes. Like ash, alder is most often used on its own as a body wood.

[Tonewood Tutorial: Everything You Need to Know About Tonewoods 2020](#)

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Swamp ash guitar: [Wood Database](#)

I wanted to figure out whether my red Stratocaster was ash or alder. It turned out that this wasn't that easy. Ash tends to have more grain than alder and hence looks more interesting in its natural state – but obviously, with its red coating, the nature of the wood underneath was well hidden. After [some digging around on the internet](#), I found that alder was predominantly used for Stratocaster bodies. However, my guitar was a 2013 Stratocaster American Deluxe, which according to Fender, had an ash body and a maple neck and fretboard.

Does it matter? Like everything to do with guitars, opinions vary on this. Certainly, [Fender themselves](#) say that the woods have important differences. This is explored further in a [Fender Custom Shop video](#) and an article in [World of Music](#).

On the other hand, in another post we'll consider the point of view that tonewood is possibly a relatively minor factor affecting electric guitar tone – a perspective verging on the sacrilegious to some. However, as we'll see, this may be something worth considering in the light of what's happening to the trees producing some of the favoured electric guitar woods – particularly ash.

Bugs

Love them or hate them, there's a lot of insects in the world. Whether you're fascinated by them or just have to wash squished ones off your car windscreen, bugs are everywhere.

The Ugly Bug Ball – Burl Ives, from the 1963 movie “Summer Magic” This song was on the radio a lot when I was a kid, and the movie harks back to a simpler, less CGI-influenced time (maybe one or two entomological inaccuracies involved too..)

My entomologist friends insist that insects make the world go round – without all the millions of beetles, bees, ants, butterflies and so on, life as we know it would pretty much grind to a halt. They pollinate our crops, help make soil and keep it healthy, provide food for all sorts of birds, mammals and reptiles – and much more. Of course, there are also all the mosquitoes, midges, biting flies, ticks and other things that annoy the crap out of people as well as carrying all sorts of diseases.

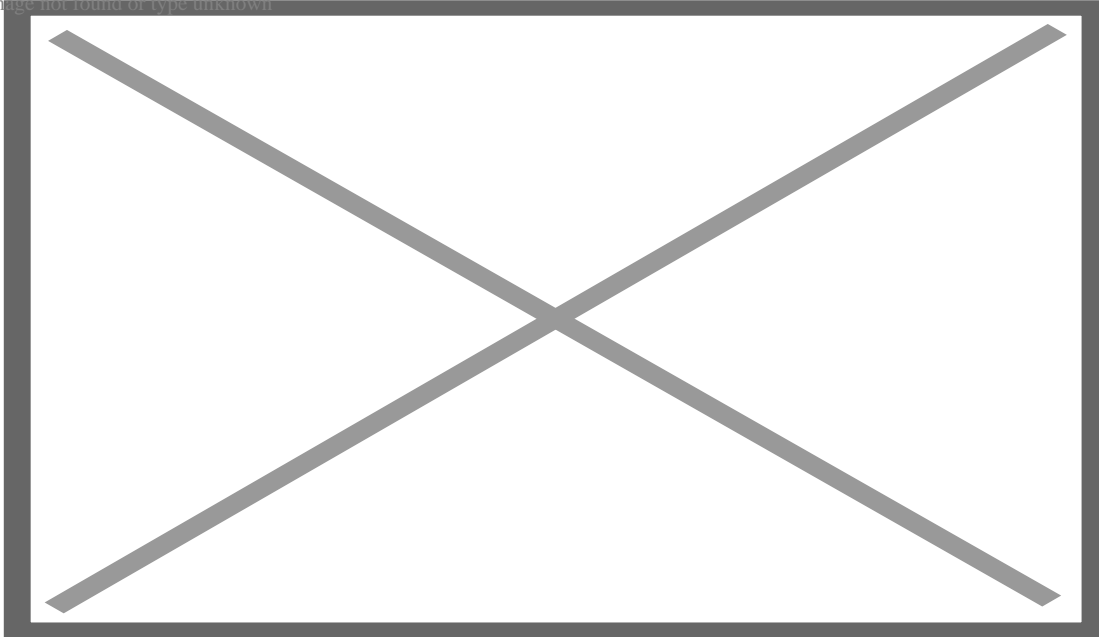
Good bugs and bad bugs. But sometimes bugs turn bad – for instance, when they are moved to new places or some aspect of their environment changes. A bug may be perfectly benign on its home turf but become a real menace in a new place. Often because it's freed from the checks and balances in place in its home habitat – things that eat it, compete with it or parasitise it and organisms that have adapted to cope with its presence.

Bugs are moved to new places more often than you might think – either by accident or deliberately. When a bug goes rogue in a new habitat, watch out for trouble. This is the realm of invasive species – which we've encountered in a [previous post](#). Invasive insect species pose some of the biggest threats to both agriculture and natural ecosystems and can have dramatic and devastating effects.

The Emerald Ash Borer

The particular felon of interest here is far from being an ugly bug. The [Emerald Ash Borer](#) is actually quite a handsome beetle – shiny emerald green, as its name might suggest. The other parts of its name point to the less desirable part of its character though – it makes a living by boring into ash trees. The beetle larvae bore into the ash tree and feed under the bark, leaving visible tracks underneath. This adversely affects the tree's vascular system and its ability to transport water and nutrients. The result is usually dieback and bark splitting, and formerly healthy trees usually die within a few years.

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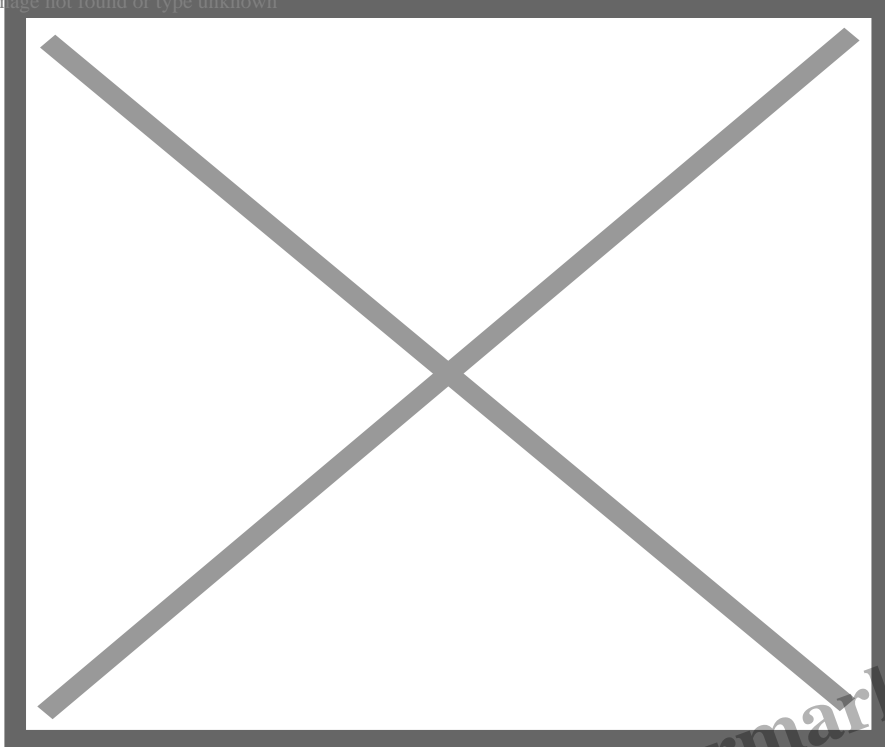


Source: [UrbanForestDweller](#)

The beetle is originally from Asia but was first found in North America in Detroit in 2002 – probably brought in on wooden packaging material. Since its arrival it has spread rapidly and killed millions of trees across multiple states and provinces in the US and Canada. It has not yet reached main areas in the south of the US where the swamp ash favoured by Fender grows – however, many feel it is only a matter of time before the beetle turns up there.

The main source of spread seems to be through human transportation of infected timber, and hence authorities are recommending care when transporting lumber and a greater emphasis on using local timber.

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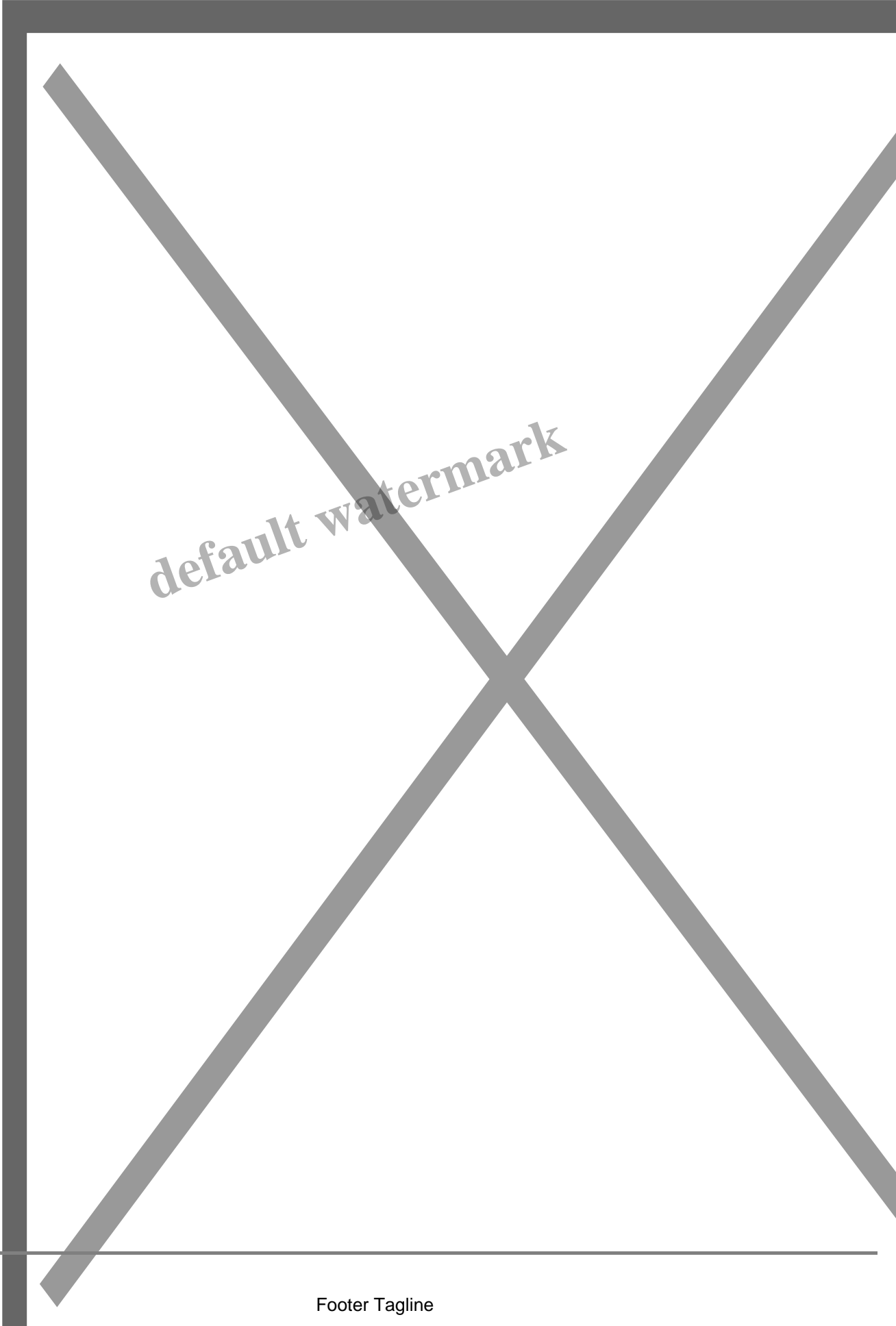


[Mississippi Forestry Commission on the lookout for Emerald Ash Borer](#)

Bugs eat guitars too....

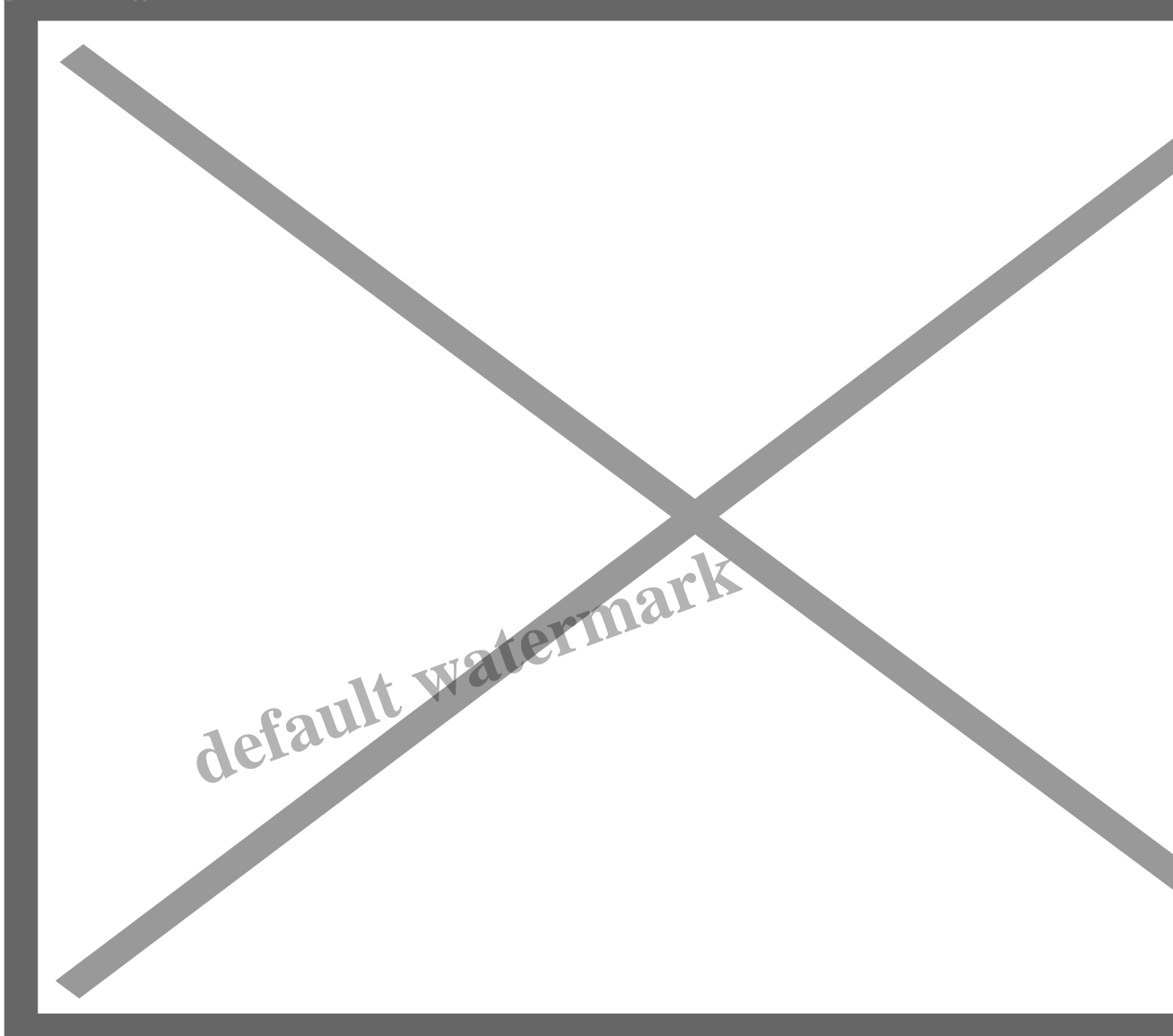
As an aside, it's not just living trees that are eaten by insects – there are numerous [stories](#) of bugs turning up in guitars, and even a video entitled "[Monsters Inside My Guitar: Ash Eating Beetles](#)". Although these bugs are unlikely to be Emerald Ash Borer, they are certainly likely to be beetles and could have been imported with the raw timber from which the guitar is made. More generally, woodworm (which is also a beetle, not a worm) has been [noted as a problem](#) for musical instruments for a long time, and [careful treatment and protection](#) is needed to ensure that the little blighters don't make holes in precious instruments.

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Borer hole and sawdust in an ash guitar

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Serious woodworm damage!

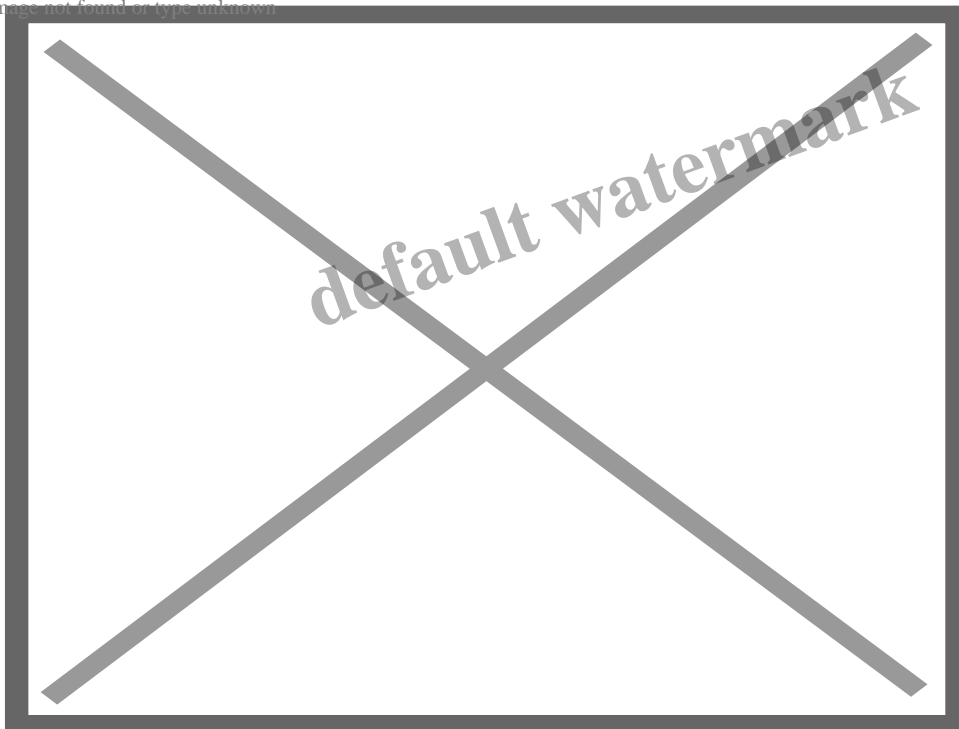
Beetle damage in guitars. Sources: [Reddit](#) and [Multiskill](#)

Floods

The threat of the Emerald Ash Borer is concerning enough to guitar makers who want a continued supply of ash wood. However, this threat comes on top of another problem that is already seriously affecting supply. We've brushed with numerous manifestations of this overall problem in several [past posts](#) – the problem is climate change. Human-induced climate change isn't just about rising temperatures – the biggest impacts come from changing weather patterns that lead to greater incidence of extremes like floods, droughts, fires and so on. The effects can be dramatic and can have important effects on [individual plant and animal species](#) and the biological communities they form.

In the case of the ash used for Fender guitars, the problem arises from the very habitat suggested in the tree's name – swamp ash. Swamps are naturally wet places – however, where the swamp ash grows is only seasonally wet. The bottomlands of the lower Mississippi are flooded every year in winter and spring as a result of rainfall and snowmelt further north. Once summer comes, however, the bottomlands dry out. The swamp ash trees are tuned in to this repeating annual cycle of wetting and drying.

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Swamp ash, Louisiana. Source: [CFP](#)

The problem is that [rainfall patterns have been changing](#) – increased rainfall has resulted in increasingly wet years recently, and this in turn has led to more intense floods and greater inundation of the bottomlands. The land has not been drying out as effectively, and floods have been persisting longer.

While the ash trees are adapted to the normal flooding cycle, increased lengths of time under water can have detrimental impacts, especially to young trees. Higher water for longer is leading to increasing tree deaths.

Not only that, but the lack of drying of the soil makes the bottomlands inaccessible – hence the normal

practice of harvesting swamp ash timber in summer has not been possible recently. So, the floods are affecting both the survival of the trees and the ability to source the timber needed for guitar bodies.

Ash on the way out?

Pests and climate change make a powerful combination with consequences for both the native ecosystems and the supply of timber for guitars.

Leo Fender was in many ways ahead of the times when he selected easy-to-source, plentiful tree species to make guitars with. But even his forward-thinking is coming unstuck as human activities change the world in complex and unpredictable ways. When we think of endangered tree species and restrictions on the use of their wood, we tend to think of the tropical species from far afield like [Brazilian Rosewood](#). However, the same dynamics are at play even within countries like the US. *Fraxinus caroliniana* is now listed by the IUCN as endangered and *F. pennsylvanica* as critically endangered.

Anticipating an increasing difficulty in sourcing traditional ash timber for their guitars, Fender [announced in 2020](#) that it would be phasing out the use of ash for all its solid body guitars – restricting it to higher end or special-run instruments. Alder has been a mainstay already, and they are experimenting with other timbers, including heavier ash species.

Nevertheless, this decision has shone the spotlight on how environmental changes are having profound impacts on virtually every aspect of life – including the manufacture of iconic guitars. One commentary piece was titled [“A tiny, invasive bug and the climate crisis are changing how guitars are made, and shifting the course of music history”](#). Another asked: [“Is Fender phasing out swamp ash just the tip of the iceberg?”](#)

Fender’s original ash-bodied guitars from the 1950s are unlikely to be replicated in the future, simply because the wood that they were made from will no longer be available. I’m left to reflect on how lucky I was to own an ash Stratocaster – even if I didn’t even know the time that it was ash beneath its cheery red exterior.

Mark Knopfler’s 1961 red Fender Stratocaster

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