people's trust for endangered species

Photo credit: Harry Green

Dear Supporter

The transition period between autumn and spring, the hard border formerly known as winter, is increasingly undefined. More of a frictionless autumn++. Leaves are coming out and the remains of what now passes as winter is rapidly evaporating. Blossom and harvest times are consistently a couple of weeks earlier than they were 40 years ago. We'll be cherry-picking before you know it. However, I'm personally optimistic that things will all get back to normal once we leave the EU and take back control of the UK's weather.

The top story of today's newsletter is about that wee beastie gracing the top of the page, the noble chafer. We then take a look at veteran features of old trees and why they're a good thing, and we consider the importance of rootstock selection; and in P&D corner we look at fungi, fire blight and frost.

Noble chafer survey – are they living near you?

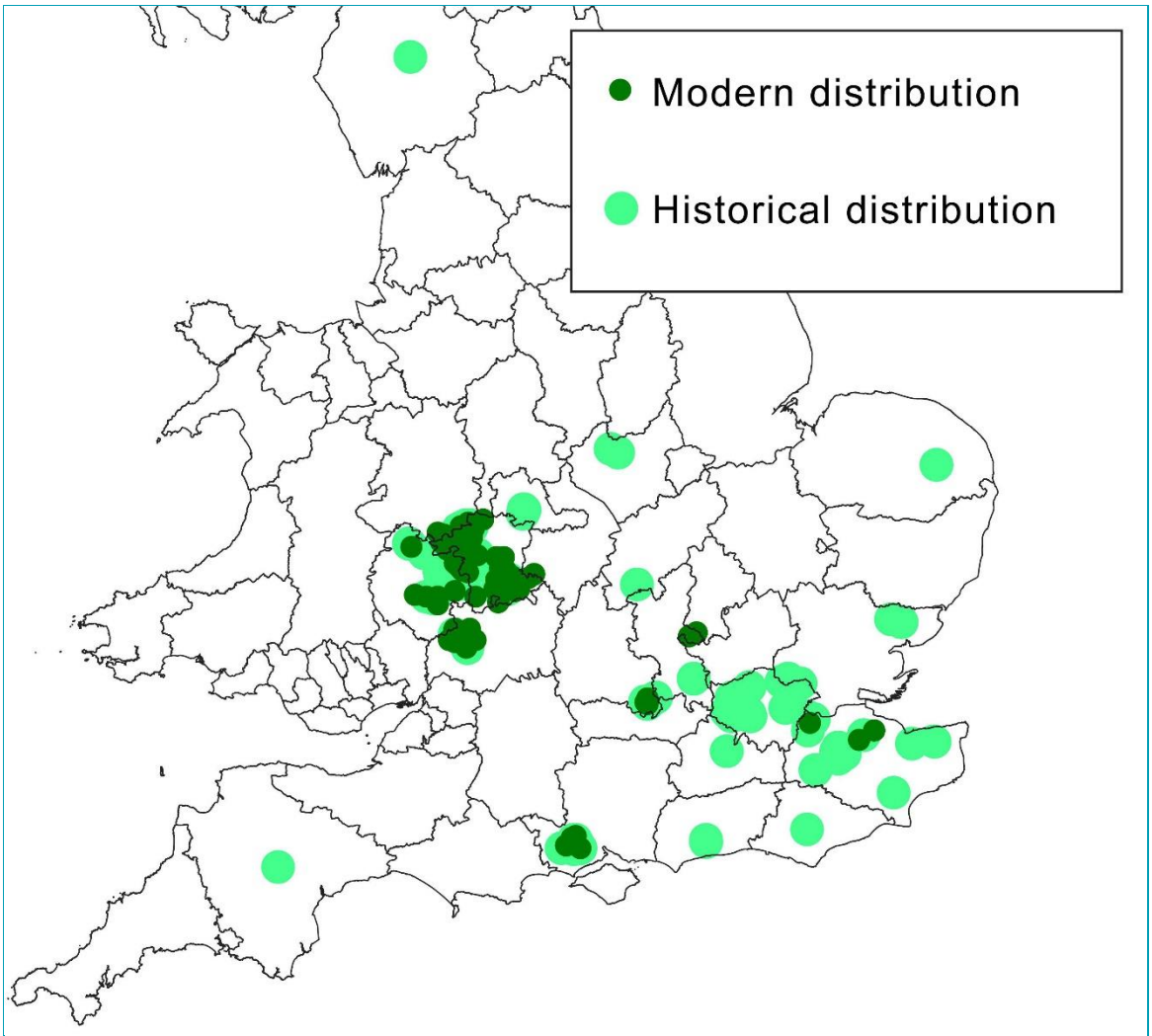
PTES is funding a new national noble chafer *Gnorimus nobilis* survey and is looking for volunteers to help for two weeks around June. Their seasonal flight time varies depending on local weather conditions.

These beautiful iridescent green beetles are threatened with the loss of their primary habitat – the decaying heart-wood of veteran fruit trees. But a new discovery has revealed that they also live in old hawthorn trees. We need to find out where these beetles still live in the UK so we can save them from extinction.

The survey

A pheromone lure attractant has been isolated so the adult beetles can be caught, marked with a small spot of non-toxic paint on the abdomen, and released. The trap will need to be checked every day or two for a fortnight. Full instructions and all materials will be provided.

Worthy of its name, the noble chafer is a perfectly civilised coleopteran. It will not bite and is completely safe to handle; unless that is you are made of wood. We will ask you to record details about any catches including the date, recaptured marked individuals, daily weather, the general vegetation in the area, and any other species caught. We would also appreciate photographs of all captures. Pinocchio and Ents need not apply.



Historical and current noble chafer *Gnorimus nobilis* distribution.

How this will help

We want to expand our knowledge of the noble chafer range so we are looking to check orchards and wood pasture sites near known existing populations and also areas with either no records or only older historical sightings. The largest known populations of noble chafer are around the Three Counties of Worcs, Herefords and Glos, but smaller populations are known in the New Forest, around the Bucks-Beds border, Oxon and Kent (see map). Historical populations were recorded across the Southeast region, East Anglia, the East Midlands, Devon, and possibly as far north as Cumbria. The recent Bucks-Beds records are in a previously unrecorded area, so there may be further undiscovered populations outside of these regions.

The lure has been developed specifically for noble chafer so shouldn't attract other insects. It has proven to be very reliable so will not only tell us where noble chafer are, but where they are not (or not any more) which is vital information for us.

The survey will be run by Deborah Harvey of Royal Holloway university, please contact Deborah for more information or to sign up for the surveyd.harvey@rhul.ac.uk
For more information on noble chafers please visit www.ptes.org/noblechafer.

Veteran trees in orchards

Photo credit: Bob Lever

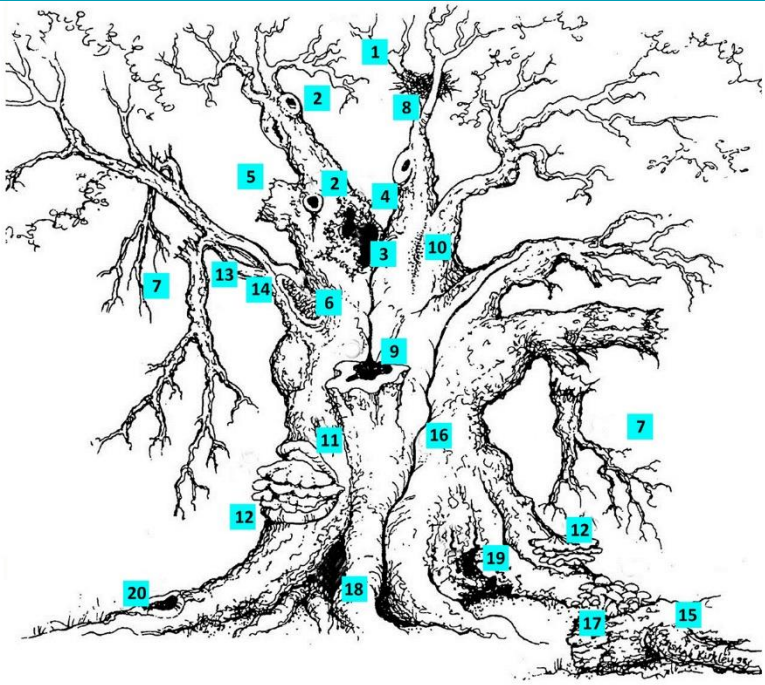
In 2007 traditional orchards were given priority habitat status. This recognised the vast contribution to biodiversity conservation that they make. For better or worse the designation does not confer any significant legal protection from destruction, but it does at least raise a flag when it comes to planning, environmental stewardship, and biodiversity landscape management.

There are a wide range of features that make orchards good for wildlife, from healthy subsoil-dwelling worm populations deep below the orchard floor, to the foraging bats and birds high above, but the key feature, the one that really clinches it for orchards, is the cavities, rot holes, fungi and deadwood associated with veteran trees. Veteran features are particularly valuable due to their natural rarity in the landscape. Outside of orchards, they can only be found in substantial quantities in the Wood Pasture and Parkland priority habitat, another habitat in short supply. However, the veterans there are non-fruit deciduous trees such as ash, oak, and beech, and these all take two or three hundred years to reach the veteran stage, whereas fruit trees will start to veteranise at around 40 or 50 years. A mere blink of an eye.

The reproduction and replacement rate of a tree is surprisingly low. Despite dispersing potentially millions of seeds, every one mature tree will ultimately be replaced by just one mature tree. A health & safety culture means that a vast number of what should be the next generation of veteran trees are deemed ‘diseased’ or ‘dangerous’ and are removed. Tree professionals consider fungal growth on the trunk or major limbs as a ‘disease’. However, this couldn’t be further from the truth. Honey fungus aside, in almost all cases fungi are living on and breaking down the dead wood contained within the trees, starting with the hard and indigestible lignin. This in turn makes the wood available as a food source for a further succession of fungi and, perhaps more importantly, a vast range of saproxylic (living on deadwood) insects and insect larvae including the noble chafer, above. These trees are not diseased. On the contrary, they are thriving with the biodiversity that has evolved over many millions of years to process and recycle dead wood back into the ecosystem. The cavities left behind are crucial for bat and bird roosting, and many other small mammals. Vast tracts of the countryside have very few natural nesting sites, which is a factor in the huge decline of hole-nesting species.

In my personal crusade to reduce the number of veteran fruit trees removed in the name of safety or development I have frequently encountered consultant ‘tree assessments’. The trees are scored according to the assessor’s opinion of their remaining life expectancy. Anything deemed to have less than 10 years of this arbitrary metric are graded ‘U’ for ‘unsuitable for retention’. The British Standard guide for this assessment includes a clause for “…conservation, heritage or landscape value”, but I have yet to see it applied to a veteran fruit tree. The problem with the life expectancy metric is that it so often fails to appreciate that through appropriate management so-called over-mature trees can be given a long and happy retirement lasting for around a third of their total lifetime, but they are instead killed just as they reach their biodiverse prime. An important new bow to our string is a paragraph in the updated guidelines for the planning process, The National Planning Policy Framework, that requires sets a very high bar for the removal of ancient and veteran trees in that it must be only for “wholly exceptional reasons”. Unfortunately, many local planning authorities have thus far failed to get the memo.

Check your own trees or trees in your local area for the veteran features described in the image below.



1 Major deadwood
Sunbaked aerial deadwood/desiccated wood (longhorn beetles)

2 Upper crown - small cavities
Dry rot holes (birds, bat roosts indicated by urine stains, hornets)

3 Crown limb - large cavities
Red, white or brown rot (stiletto flies cardinal, click and darkling beetles. Barn owls)

4 Fungal growth on limb
Fungi on bark (wood awl flies, false ladybirds)

5 Snag/stub
Large surface area for egg laying and fungi (cardinal beetle)

6 Bark with fungal growth
Fungi on bark (wood awl flies, cardinal beetles, false ladybirds)

7 Broken limbs
Broken ends provide large surface area for egg laying and fungi

8 Weak fork with included bark
Nest site (birds, squirrels, rove beetles, micro-moths)

9 Water pools
Collected standing water (hoverflies, water beetles, drone flies)

10 Flux on bark
Established sap runs (sap beetles, hoverflies, fungus gnats)

11 Scar tissue from old wound
Damaged loose bark (bark beetles, false scorpions, spiders)

12 Bracket fungi
Heart rot prepares wood for invertebrates (fungus gnats, fungus beetles, noble chafer, darkling beetles)

13 Delamination of wood
Exposed wood and peeling bark (spiders, sap beetles, cardinal beetle)

14 Subsiding major limb
Fracture can produce shattered stub habitat

15 Fallen limb
Fallen timber provides wet rot habitat: leave in partial shade

16 Lightning strike
Burnt wood (flat bugs, false weevil, smoke flies)

17 Fungal colonisation of root
Damaged loose bark (bark beeltes, false scorpions and spiders)

18 Basal cavity
Hollowing trunk (cardinal beetles, lesser stag, crane flies)

19 Rot hole in trunk
Soft-textured white rot (lesser stag, rhinoceros beetle, combhorn crane flies

20 Root damage from browsing
White rot (stag beetle, hoverflies, combhorn crane flies)

Illustration: Neville Fay

Rootstocks

With a seamless segue worthy of a BBC continuity announcer, the key determinant of whether trees will reach veteran stage at all is their rootstock and is at the heart of what makes an orchard ‘traditional’. To kick off, a brief history of rootstocks...

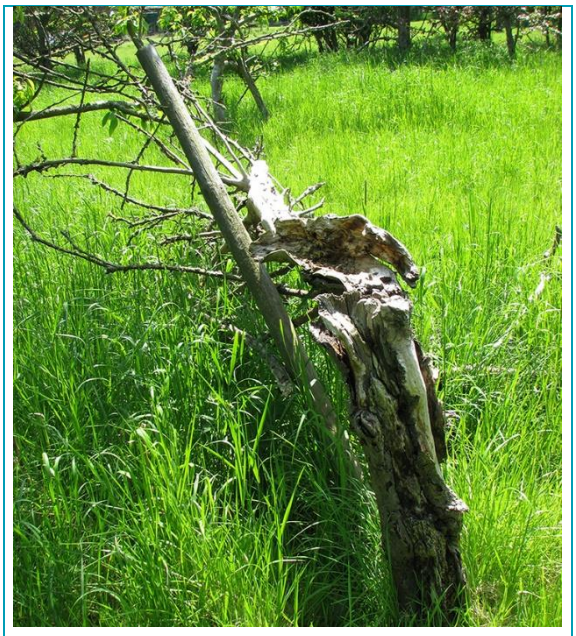
Throughout the fruitful mists of time people have wanted trees suited to a variety of uses and spaces. Cultivars with desirable qualities were, and still are, selected and propagated. This includes those with a tendency to low vigour which were prized for smaller gardens and special tree forms, like espaliers. Early Persian walled gardens were called *pairadaeza*, which translates to paradise garden. It is from this root (sorry) that we received the ‘Paradise apple’. These were the origins of the dwarf trees in widespread commercial use today, mostly in intensively managed orchards. The readily suckering Paradise apples were however, a confused grouping of many varieties.

Veteran tree with productive crown

In the early 1900s horticulturalists at East Malling Research Centre, Kent, being joined later by the John Innes Institute at Merton, London, set about rationalising and breeding new standardised rootstocks. The fruits of their labours are the rootstocks known to us today – M9, M26, M27, MM106, M25, MM111 and so on. See a list with descriptions on our website here.

Unfortunately, dwarf trees, being shorter-lived than standard vigorous trees, do not serve the purposes of habitat and biodiversity exceptionally well. The most dwarfing

trees, such as M9, start to degrade and practically come apart at the seams after about 40 years, but they're unlikely to even reach this age in any case as production orchards are frequently replaced with fashionable varieties – gone are the Cox's Orange Pippins of my youth, replaced by Braeburns (discovered 1952 – a whippersnapper by apple cultivar standards) that are better suited to controlled atmosphere storage, and these in turn are being replaced by more modern varieties.



Dwarfing rootstock at circa 45 years. Collapsed structure, roots unable to hold trees up, no trunk cavities

Semi-standard trees, such as the ubiquitous MM106, only came into popular use in the 60s meaning that the oldest known trees on this stock are in their 50s. It has yet to be conclusively determined if they will develop stem and bough cavities*, and even if they do, they will probably be rapidly approaching the end of their productive life so won't be around long enough to support a thriving saproxylic assemblage. Ergo, my slight (ahem…) obsession with always planting vigorous rootstock trees, either throughout the orchard or at least as a component.

This ensures habitat continuity for a century or more depending on which fruit type is planted: perry and warden pears can live to around 300 years. Veteran features begin to develop at 40 or 50 years of age so, all things being equal, they will persist for a further 40-80+ years.

When choosing new trees, look for a supplier with vigorous trees ready to buy off-the-shelf. Some nurseries cite a lack of demand as a reason to not stock them. In science-speak that's called confirmation bias. Whilst it holds true that a naturally vigorous tree, like Bramley's Seedling, Warner's King or Blenheim Orange (incidentally all triploid varieties) on a vigorous rootstock will indeed outgrow a small

space, most varieties can be suitably pruned to fit the allocated space. This is especially true for cultivars with notably low vigour such as Lane's Prince Albert and Golden Spire, some of which will do nought but sulk if grafted to a low vigour rootstock. Years of widespread planting of semi-vigorous or dwarfing trees will lead, in the near future, to a dearth of orchard trees with cavities. As a result, many already scarce insects will become increasingly vulnerable to extinction and the species that need such features to survive will face even greater environmental challenges.

*If you know of an orchard planted on MM106 that is over 50 years old please get in touch – steve.oram@ptes.org.

P & D Corner

Fungi on trees – biodiversity, not a disease

As discussed above, with a disappointing, nay tragic regularity, mature trees are destroyed in the name of health & safety and development. Trees with active fungal growths are labelled as diseased and entirely removed without any attempt to make them safe or provide a managed retrenchment. Shortening of limbs, bracing, fencing, and topping are all perfectly valid techniques to prolong the life of mature trees. In the case of development, veteran features are shamelessly exploited as an excuse to extirpate trees that are incompatible with the plans.

Pholiota aurivella on 80 year old Bramley's seedling

Photo credit: Japhet Goodburn

Orchard toothcrust fungus *Sarcadontia crocea*, only found on veteran apple trees. You won't ever find this rare little beauty on semi-standard or dwarfing trees

Fungi comprise a huge and immeasurably important group of life-forms essential to all other life and fried breakfasts across the world. They are nature's recyclers, freeing the elements used to build biological organisms back into the environment so that they can be reused, and have evolved alongside other life-forms for about 1.5 billion years. Fungi on trees are invariably feeding on dead plant matter, including pathogenic fungi which may attack and kill living tissue in order to make it available for processing. The most notable of these is honey fungus Armalaria mellea (this can kill young and old trees, but healthy mature trees are likely to not be infected).

Every species of fungi has unique characteristics that dictate what it will digest, the conditions required for it to survive and, indeed, if it's any good in a pasta dish. The process of wood decomposition can involve hundreds or even thousands of different fungi, and many of these will be entirely different species depending on the species of tree and whether the dead wood is dry-standing or wet-fallen.

Fungi on trees, commonly bracket-type fungi, are a sign that the heart wood is decomposing. This can be used as an indicator that it may be a prudent to employ measures to prevent catastrophic limb failure. When managing tree senescence, it is better for wildlife if the internal parts of the tree are kept dry. To this end, consider

cutting at an angle that will restrict or eliminate ingress of rain water, or for central stem reduction, cap off upward-facing cavities using wood cut from the tree, or a piece of marine ply for example.

Fire blight - Erwinia amylovora

This is a disease, and a potentially mortal one. It primarily infects the pear family, but can also affect apples, hawthorn and other members of the Rosaceae family. The stone fruits are not affected. It gets its name from the burned-to-a-crisp symptom it causes. The fire blight bacterium enters through the blossom and spreads rapidly under the bark, causing a dark stain to appear on the cambium layer. The bacterium generally needs warmer temperatures to be active and infectious than the UK climate provides during blossoming, although this may change - see the next article. For this reason, it is important to remove late secondary blossoms, often seen as single or several flowers around June or July.

As soon as fire blight is detected, cut the diseased branch out one foot below the infected area, or two foot in larger branches. Remove the arisings from the site, or burn them. Always disinfect your tools between cuts when removing diseased wood.

A branch infected with fire blight

A pear tree ravaged by fire blight

Is Jack Frost a victim of climate change?

A late visit from that disreputable bounder Frost can wipe out entire crops. Plums and other early flowering stone fruit are most at risk. However, a warming climate and earlier springs means this may be less of a risk than in the past; and some growers are having more success with early to blossom fruit such as apricot and peach. As widely recognised with earlier apple flowering days, warmer temperatures affect plants differently. Consider the adage “oak before ash we’ll have a splash, ash before oak we’re in for a soak”.

A plant’s tendency to be governed predominantly by photoperiodism (day length, like ash) or temperature (apple, oak, snowdrops, daffodils, and so on) will determine whether or not it will flower early.

This leads to a decoupling of pollinator emergence and flower availability, with unpredictable consequences. It is thought, all things being equal, that the UK’s agricultural output may increase in a warmer climate, but things are far from equal – there may be more summer droughts, more violent storms, crop-destroying hailstones, increased and new pests and diseases… brimstone and hellfire, zombie apocalypse, hell in a handcart… none of which will do much for crop production. Added to this is the requirement for ‘chill hours’. Some varieties will crop poorly without sufficient cool days during the dormant period (see the Jan 2017 newsletter for more details about this – or request a copy).

The following graphs show a distinct upward trend in temperatures from 1960 – 2016 (measured in Kent). Figure 1 shows average winter temperatures increasing from

c.2.2 to c.3.8. That's difficult to ignore; Figure 2 shows that the last frost of each year (or at least sub-zero temperature) has retreated, on average, from day 107 (16th March) to day 102 (11th March); Figure 3 shows that the temperature of the last sub-zero recording is not as cold as it used to be; and the most startling measurement is that sub-zero days overall have dropped by around 37% (46 – 29, Fig. 4).

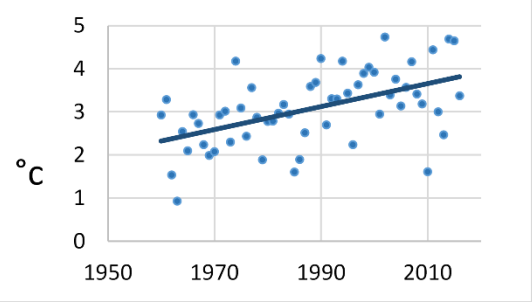


Fig. 1. Average winter temp. (01-Nov to 31-Mar)

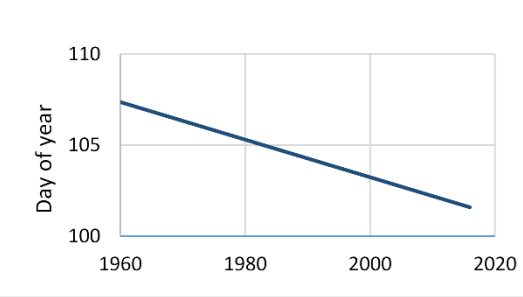


Fig. 2. Last day of sub-zero min. temp. (trendline)

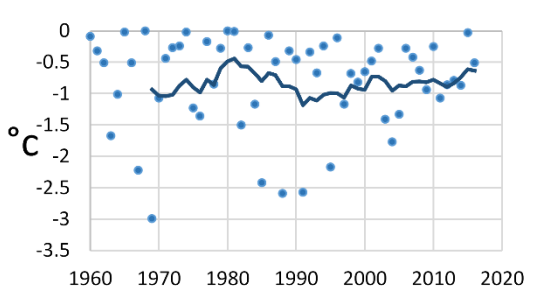


Fig. 3. Temperature of last spring frost - 10 year moving average trendline

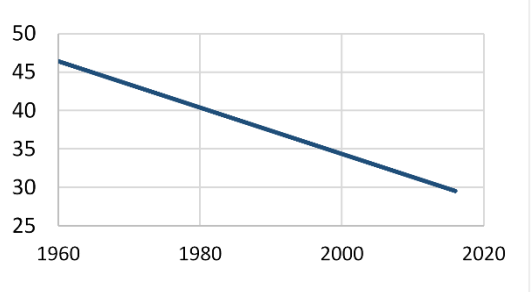


Fig. 4. Days < 0°C recorded by year

(Data from the NERC Centre for Environmental Data Analysis based on long-term weather station readings from a site in the Kent fruit belt).

May the fruits be with you,

Steve Oram
Orchard Biodiversity Officer

If you liked the content of this email send it to a friend

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