# Orchard Network Crab Apple Project

## "Will the real *Malus sylvestris* please stand up?"

## THE CRAB NEWSLETTER: MARCH 2024

**A SITUATION BEYOND OUR CONTROL HAS DELAYED THE NEXT NEWSLETTER, AND MAY ALTER THE COURSE OF THIS PROJECT MATERIALY.**

Orchard Network is a partnership of organisations working together for the conservation of orchards across the British Isles.
To see Orchard Network (www.orchardnetwork.org.uk)

**The Crab Apple Project objective is to record tree, leaf, flower and fruit morphology, other fruit characteristics, and DNA fingerprints, of a range of wild crab, hybrid and feral apple trees in natural locations in the British Isles:**

1. **to see if this helps to identify native *Malus sylvestris trees* and separate them from *M domestica,* and from wild/feral hybrids with *M domestica* (and other *Malus* species).**
2. **to provide, if possible, a field identification method to separate the native *Malus sylvestris* from hybrids (and we recognize that many before us have already tried!)**
3. **evaluate the fruit of both the species and its hybrids for apple and cider apple breeding – not least to pass on its relatively disease-free character to cider apples.**

## PROGRESS OF THE PROJECT SO FAR

### 2022 and 2023

The funding for this national project is a grant provided by City of London, which owns open access land around London, including Epping Forest, Burnham Beeches, Ashtead and Hampsted Heaths and other commons, that have many crab apple trees. The funding provided funding for DNA fingerprinting of up to 350 tree samples over 3 years, and some expenses.

During the design and planning before project in 2021, some 15 crab apple trees from Dorset and Suffolk (where the two members of Orchard Network that planned the project live) were DNA fingerprinted in preparation, and this data, and their morphological data is now joined by the 2022 surveyed trees in our data spreadsheets.

103 trees were surveyed in late April and May 2022, and their morphology recorded from 16 localities across England, by over 30 surveyors. From the spring surveys sent in, 45 trees with a wide diversity of flower and/or foliage morphology were selected for DNA analysis: surveyors gathered leaves and sent them to EMR (East Malling Research) in June for freezing to await analysis.

We requested that surveyors survey the same trees they surveyed in spring to survey in autumn and forms were sent to surveyors in time for a September to late October survey of the fruit. This combined information gave us the first full overview of the range of morphology of the trees being surveyed. Of the 103 trees surveyed in Spring, we removed a number trees from the survey as they were either large and clearly *M domestica* apples, or were red-flowered or other ornamental *Malus* species. However, of the 97 trees, only 60 trees were surveyed in autumn, fewer than hoped, and surveys of these were requested in autumn 2023 in order to be included in the project. Most of these have now been surveyed.

An important part of this project was always that we would have **DNA analyses and morphology data from both seasons of the same trees** by the end of 2023 from over 100 trees, and then be able to look at different aspects, even different DNA analyses methods, as needed.

**The DNA analyses of the samples sent in in late spring 2022 were received from EMR in December 2022.**

**In 2023** the morphology surveys continued in both spring and autumn. During the spring survey period a new selection of additional trees were added, and in June 2023 a further 49 tree samples for DNA analysis were sent to NIAB (see below) for expected results in autumn 2023. Unfortunately, not all the tree morphology surveys planned have been completed, and these **still need to be carried out this late April and May 2024, and a smaller number in autumn 2024**.

**THE CURRENT SITUATION**

The project had planned to acquire morphology surveys and the corresponding DNA analyses for around 100 selected trees by the end of 2023 so that the project could then plan a final interpretation stage in 2024.

Unfortunately, by the end of 2023 no results from NIAB had been made available to FruitID, who have provided the service, and its interpretation, for the last 8 years, and to this day are still awaited. During 2023 the National Institute of Agricultural Botany (NIAB), parent company of East Malling Research, moved their SSR DNA analysis service from East Malling to NIAB headquarters in Cambridge, with new equipment and new staff. The webmaster of FruitID, who conceived and has managed the service since its inception has passed information to us that the problem is reported by NIAB to be the calibration of new equipment to the original objective standards, aggravated by new staffing issues, but there is no indication of when the service, now delayed by more than 3 months, may resume.

We had already made some plans to add more trees, and run further analysis this May/June dependant on the analyses we should have received 3 months ago, and these may need to be re-assessed. Also, a critical component of the missing analyses is

that it included samples from two trees from Edinburgh Botanic Garden's *Malus sylvestris* project that *might* have given us some connection, or calibration, with their results.

**We should assume that eventually we will receive relevant DNA analyses from NIAB, and that annual service will resume, but we also need to plan for a far greater delay.**

**TO THAT END WE PROPOSE:**

**1 That we plan for a possible late supply of the 2023 analyses, even if later than the deadline for this year's analyses.....and will delay making data analysis plans.**

**2 As we still require some missing morphological tree survey data this spring, I will be in touch with the relevant surveyors about this within the next few days.**

**3 Plan to release a further Newsletter over the next month with the range of options open to us, both with and without a resumed service from NIAB.**

**4 Fully inform our funder of the situation.**

**AND ALSO...**

1 In Autumn 2023 probably the most isolated group of crab apple trees in our survey were reported from Cwm Banw, Powys, Wales, and 2 sets of samples were sent to me. Both trees had consistently small fruit, uncoloured/greenyellow, **rarely more than 27mm in diameter**. These coincide with the size with trees recorded by the Edinburgh Botanic Garden survey as pure *Malus sylvestris,* and which, they report have only been recorded from sites well isolated from domesticated apple trees.


**Cwm Bouw by silver birch SAR1 (t).jpg**

2 This winter Woodland Trust has planted 59 grafts of tree recorded as pure *M sylvestris* by Edinburgh Botanic Garden trees at Woodland Trust's Glen Finglas Estate in the Trossachs, with another 23 to be planted next winter, see Scotland's new wild apple gene bank - Woodland Trust. A principal reason for this planting in such an isolated location is to provide seed for nursery propagation, following the paper by Edinburgh Botanic Garden that all the commercially propagated seedlings, that they tested, sold as *Malus sylvestris* should be considered hybrids with the domesticated apple, or were apples.

3 Elsewhere in Europe several other collections said to be pure *Malus sylvestris* already exist, some decades old, planted for similar reasons. These include a Dutch collection at Wilheminadorp, in Germany, several in Scandinavia. For the Nordic countries see NordGen Our work - NordGen, which to illustrate its article on *Malus sylvestris* with this image, below, of the flowers, with characteristic narrow, pure white petals, with narrow insertions and little overlap, just as described in early English floras, and as we regularly see in some of our surveyor's photographs.

**WITH THANKS TO ALL OUR SURVEYORS**

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**27 March 2024**
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**WITH**