



SESSION 774:

## THE MISSING WOODLAND RESOURCES: APPROACHES TO THE TECHNOLOGICAL USE OF PLANT RAW MATERIALS

# SELECTIVE USE OF *CORNUS SANGUINEA* L. (RED DOGWOOD) BERRIES IN LATE NEOLITHIC

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Numerous fragments of *Cornus sanguinea* shells in the cultural layer of Late Neolithic pile dwelling site Strojanova voda at Ljubljansko barje, Slovenia were found during excavation in 2012. Fruits of red dogwood are considered inedible, but numerous crushed shells of it in the cultural layer suggest that they must have been used for some purpose. The experiments and chemical analyses were made to get useful information about possible usage.

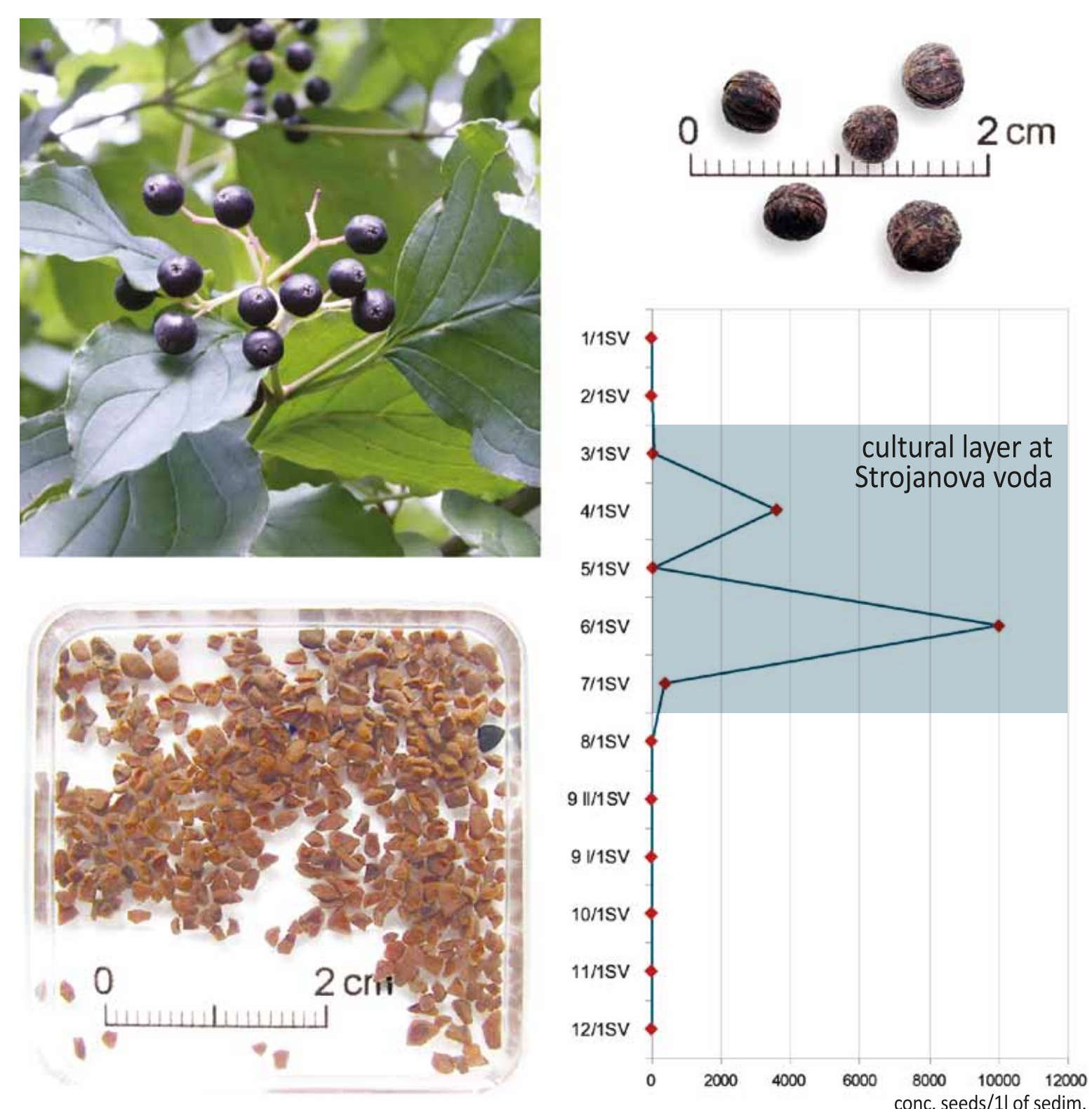


Fig. 1: Numerous fragments of *Cornus sanguinea* shells in the cultural layer of Late Neolithic pile dwelling site Strojanova voda at Ljubljansko barje, Slovenia (dated app. 4000 cal BC), indicate selective use of red dogwood fruits/seeds.

More about the archaeobotanical investigation of the site in: Tolar T. 2018 ([http://av.zrc-sazu.si/pdf/69/AV\\_69\\_12\\_Tolar.pdf](http://av.zrc-sazu.si/pdf/69/AV_69_12_Tolar.pdf))



Fig. 2: The experiment was made with the materials and tools known and used in Late Neolithic.



Fig. 3: It was established that fruits were most probably processed on a quern-stone, where very fine and malleable material could be gained.



Fig. 4: By cooking and boiling the malleable material some oil can be extracted. The same was observed also when cooking the whole, i.e. uncrushed fruits. Therefore, oil extraction could be one of the possible usage.

Beside malleable (Fig. 3) and foaming (Fig. 6) characteristics, the cleansing one (Fig. 7) was the third that led us to the assumption of using the red dogwood fruits for cosmetics (i.e. soap, cream), detergent or even medicinal purposes. Therefore chemical analyses were done on: 1) whole fruits, 2) lignified endocarps and 3) juicy meso-/exocarps of the fruits.



Fig. 5: The experiment of dyeing three different types of textiles and threads with the boiled material of fresh and processed red dogwood fruits showed that this kind of use is less probable.



Fig. 7: After grinding the fruits in mortar (b), it became cleaner (c) than before (a).



Fig. 6: The same applies to the possibility of using it to make juice, since the boiled "soup" does not have an attractive smell.

Chemical analyses confirm some groups of lipids, anthocyanins, proanthocyanidins and saponins (Figs. 8 – 11).

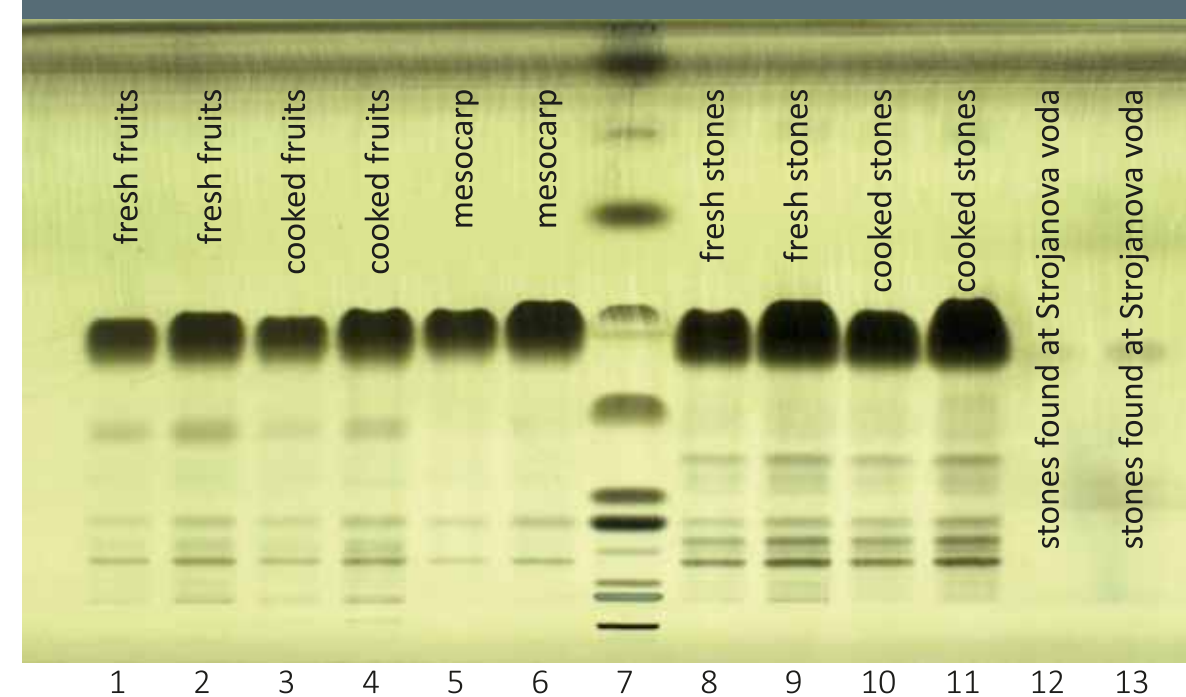


Fig. 8: Analysis of lipids of standards (7) and in the extracts of different parts of red dogwood fruits (1-6, 8-13).

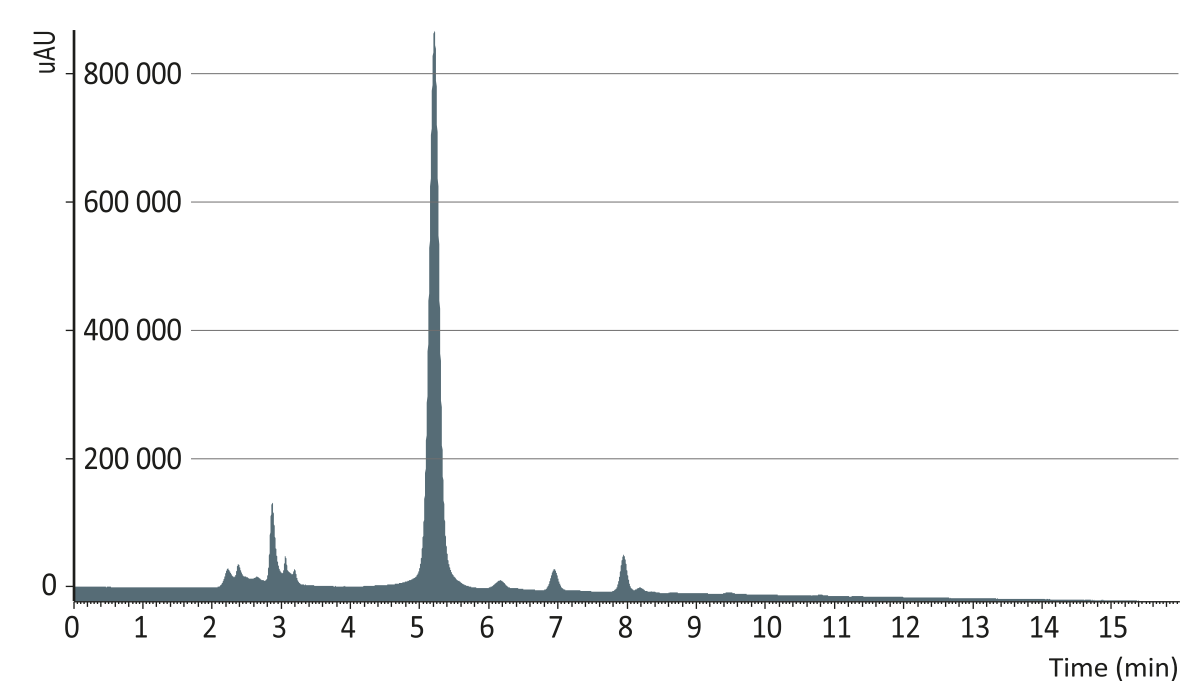


Fig. 9: Analysis of anthocyanins (red and blue pigments) in fresh red dogwood fruits exocarp.

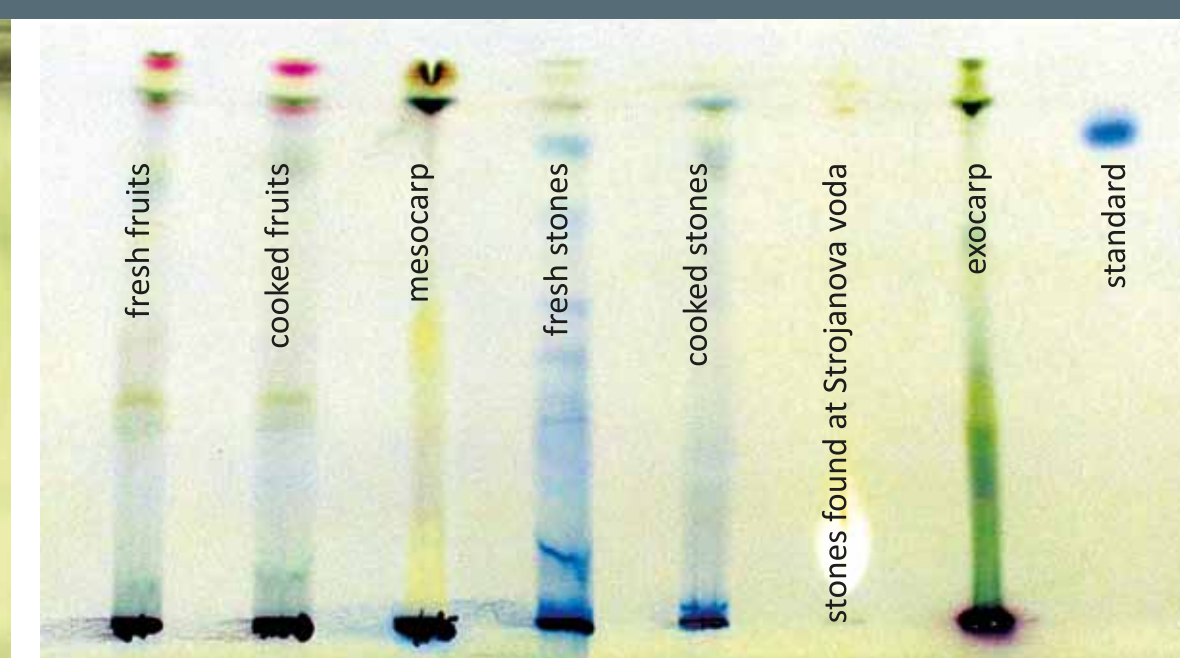


Fig. 10: Analysis of proanthocyanidins in the extracts of different parts of red dogwood fruits. Proanthocyanidins are better present in stones (4, 5), less in whole fruits (1, 2). After cooking the amount of proanthocyanidins is lower (2, 5). In archaeological stones (6) this antioxidant completely oxidized in ca. 6000 years.



Fig. 11: Presence of saponins in the extract of red dogwood fruit mesocarp is obvious.

## Conclusions

Both experimental and chemical methods confirm our suspicions that red dogwood fruits could beside oil extraction very likely be used as a sort of soap, detergent or cream. The fruits contain: saponins, lipids, anthocyanins and proanthocyanidins. The latter has even antioxidative characteristics which are efficient as antiage and antibacterial agents in today pharmacy.