Setsunan University

Applied Biosciences

Plant Science in support of traditional culture

Understanding the physiology of the lacquer tree and supporting traditional culture

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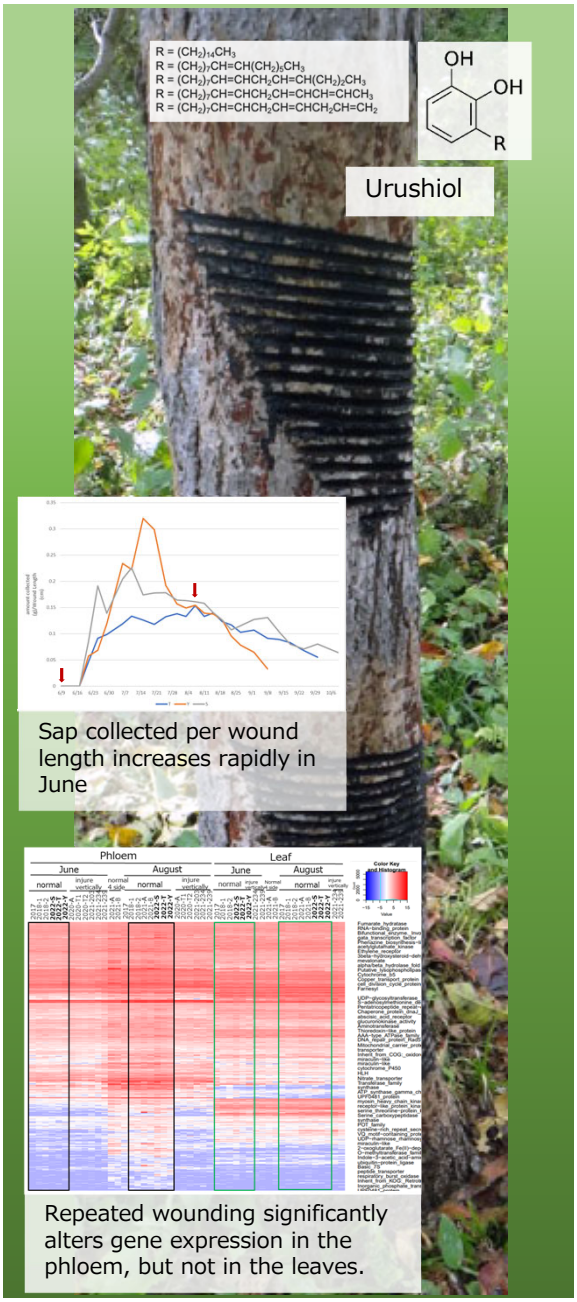
Key words Urushiol, lacquer tapping, wounding response of plants, chrysanthemum dolls, lignin

Summary

- 【**Traditional Lacquer**】 The lacquer trees (*Toxicodendron vernicifluum*) grow in temperate region of East Asia. The raw material for lacquer, called raw lacquer, is produced in the inner bark cells of the lacquer tree and secreted and accumulated in resin ducts.
- 【**Urushiol**】 The main component of raw lacquer is a lipid called urushiol, which is believed to be synthesized through the polyketide pathway, but the responsible genes still remain unidentified. Several proteins, including laccase, co-exist in raw lacquer and are thought to be involved in regulating the oxidative polymerization of urushiol.
- 【**Lacquer tapping in Japan**】 In the traditional Japanese method of lacquer tapping, wounds are made in the trunk of the lacquer tree every four days and the exuding sap is collected. The gradual lengthening of the wounds is thought to promote the formation of intercellular spaces called wound ducts. However, a recent report suggests that the contribution of further wound duct formation to the increase in sap collection from June to August is rather small and that repeated wounding may activate secretory cells in the ducts of the trunk.
- 【 Doll's Chrysanthemums 】 Chrysanthemum-dolls are one of the traditional crafts made from Chrysanthemum flowers. The chrysanthemums used to make the dolls are a variety with flexible stems known as Doll's Chrysanthemums. A study of the lignin content of Doll's Chrysanthemum stems showed that, contrary to expectations, there was a high level of lignin in the stems, which is thought to make the thin stems less likely to break.



Papers

Ferritin 2 domain-containing protein found in lacquer tree (Toxicodendron vernicifluum) sap has negative effects on laccase and peroxidase reactions Biotechnol Biochem. 81(6):1165-1175.(2017)

Appeal points

I am trying to apply the tools of molecular biology to minor materials such as lacquer tree and Doll's Chrysanthemum.