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Color changes of leaves in autumn studied by *in situ* spectro-colorimetryEri Yamakita and Satoru Nakashima
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In autumn, some species of plants change colors of leaves from green to red or yellow. Although this phenomenon is familiar to us, especially in Japan, color changing processes have not been fully understood. One of the problems is that extraction experiments are needed to measure changes in the chemical components such as pigments in leaves. Therefore, it is almost impossible to measure changes with time of chemical components in the same leaf during its color change. In this study, a handy spectro-colorimeter (PRISMO MIRAGE) have been developed and applied to monitor color and visible spectral changes with time of leaves of *Acer palmatum*, Japanese maple (Iroha Momiji). Two branches under different sunshine conditions in the Osaka university campus were chosen and 8 leaves are measured once per day in the morning from October 24 to December 7, 2016. Visible reflectance spectra of leaves changed with time during their color changes. Green leaves show a strong absorption band around 670 nm due to chlorophyll. During their color changes from green to red, the 670 nm band decreased and a band around 550 nm appeared and increased with time. This 550 nm band is due to anthocyanin. Concentrations of chlorophyll and anthocyanin were calculated by using spectral reflectance values (Gitelson et al., 2009). They are plotted in Fig. 2 with a color scale corresponding to a* value (reddishness). The reddish colors are determined not only by anthocyanin concentrations but also by chlorophyll concentrations. In fact, our studies with other plants indicate stronger correlations of a* value with the chlorophyll concentrations than anthocyanin ones. Color changes of leaves can be controlled mainly by chlorophyll degradation associated with formation of anthocyanin.

Biography

Eri Yamakita is a graduate student of Osaka University. She had majored in both biology and physics as an undergraduate and is interested in interactions between plants and environments, especially by using non-destructive evaluation methods. Her master thesis was on water retention ability of pectin, which is one of the polysaccharides in the plant cell wall. For her doctoral studies, she is examining interactions between rocks and mosses as the first biota growing on rocks.

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