Geophysical Research Abstracts
Vol. 16, EGU2014-16638, 2014
EGU General Assembly 2014

How do trees know it is autumn?

Stefan Jansson
Umea Plant Science Center, University of Umea, Umea, Sweden (stefan.jansson@umu.se)

To predict how forests will respond to climate change, it is necessary to understand how trees actually interpret environmental signals that the winter is approaching and use them to induce growth arrest, cold hardiness development, autumn leaf senescence and abscission. Autumn phenology traits and also under strong genetic control, and there exist within most tree species large variation in most phenology traits. Our model system is aspen (Populus tremula); one of the most widespread and abundant deciduous trees on earth. Growth arrest/bud set and cold hardiness in aspen is triggered by the gradual shortening of the photoperiod is the late season, and the molecular details behind have to some extent been deciphered. The molecular machinery triggering autumn leaf senescence – a trait developed to minimise nutrient loss – is in contrast, very poorly understood but bud set/growth arrest is a prerequisite for aspens to develop a competence to respond to the environmental signals triggering senescence. Once competence is developed, initiation of senescence seems to be triggered not by the daylength but some other daylight cue, and once senescence has been initiated the progression is influenced by temperature. The nitrogen, as well as carbohydrate, status interact can modify the senescence program of the tree. We are also identifying the precise genetic polymorphisms that are responsible for natural variation in autumn phenology traits in aspen, and study how different populations have different genetic makeups that provide local adaptation. Taken together, other environmental factors are more important than temperature is setting the timetable for aspens in the autumn. Although much less is know how autumn phenology traits are regulated in other tree species, the effect that increasing temperatures may have on future tree populations will also be discussed.