

Forest list archive: [msg00144](#)

[\[Prev\]](#)[\[Next\]](#)[\[Index\]](#)[\[Thread\]](#)

Re: Foliage color - Forest health

- **To:** Multiple recipients of list FOREST <FOREST@LISTSERV.FUNET.FI>
 - **Subject:** Re: Foliage color - Forest health
 - **From:** Hisao Fujii=?ISO-2022-JP?B?GyRCIUpGIZBmNVdNOiFLGyhK?=<fujiihi@FFPRI.AFFRC.GO.JP>
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I appreciate Gerry Hawkes's and Sjef Lamers's messages that have much concern about the influence of pollutants.

I should add some descriptions of the hardwoods' conditions in Japan, because my previous note was focused on the leaf colour change up to the time in Japan.

As I described in my previous note, the foliage of Japanese hardwoods also has been damaged. The cuticula damages in lowlands are obvious especially in old leaves of some perennial hardwoods such as *Pieris japonica* and *Quercus myrsinaefolia*. The influence of rain leaching are obvious especially in the new leaves of many species both deciduous and perennial in spring, which don't have enough cuticula protection yet. In lowlands, these leaf damages and the tree decline in hardwoods were not so prominent in many species as the conifers until a recent date. Some twig-top leaf losses and some foliage decrease were observed and some species such as *Zelkova serrata* showed early defoliation in early autumn, which were thought to be due to weakening of the trees caused by soil acidification. But leaf damage symptoms are now increasing year by year, and after the rain in last week, serious rain leaching symptoms are observed in Kanto area. Acid fog or acid dew also may be affecting them. If such circumstances progress, Japanese lowland hardwoods also may decline and show dieback seriously in near future.

In the mountainous and sub-alpine zone in Japan, more serious tree decline including tree deaths has been observed in both conifers and hardwoods, such as *Abies firma*, *Abies Mariesii*, *Tsuga diversifolia*, *Fagus crenata*, *Betula Ermanii*, etc. I think, the reason why tree decline in highlands is more serious, may be poor soil cations and nutrients, and the

harsh climate. The many soils in Japanese sub-alpine zone are podsols or podsollic, and very acid originally. The winter climate in most Japanese lowlands is more moderate than Vermont, but in highlands not so. The influence of acid deposits or air pollutants may weaken the cold hardiness of the trees, and may be the background cause of frequent occurrence of diseases and climatic damages.

For example, the regional distribution of foliage decrease decline in *Cryptomeria japonica* and *Chamaecyparis* in lowland Kanto area, was most similar to that of secondary pollutants (acid deposits), though the site-to-site dispersion was very large. On the sites with the strata, mainly the surfaces of which tend to be acidified, shallow-root species (such as *Chamaecyparis*) tend to decline more. The soil exchangeable aluminum shows correlation with the *Cryptomeria* decline, though phytotoxic aluminium is difficult to quantify. These facts indicate that the influence of acid deposits through soils, is the main cause of the tree decline. Cation leaching may be progressing also in Japan.

The influence of soil acidification is thought to be both cation loss and toxicity of aluminum et al., which accelerate and induce each other. And which influence is more dominant, varies in site by site. I'm now studying 2:1 clay surface aluminum (electric-diffusion-double-layer aluminum) which is possible phytotoxic aluminum, and depends also on cation concentration and soil pH.

Regards.

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Follow-Ups:

- [Re: Foliage color - Forest health](#)
 - From: Gerry Hawkes <ghawkes@SOVER.NET>
- [Re: Foliage color - Forest health](#)
 - From: Nelson Wong <nelson@MTC.COM.MY>

References:

- [Re: Foliage color - Forest health](#)
 - From: Gerry Hawkes <ghawkes@SOVER.NET>

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- Prev: [Re: Externalities Cont.](#)

- Next: [Re: Foliage color - Forest health](#)
- Index: [Forest mailing list May 1996](#)
- Thread: [Forest list subjects in May 1996](#)

[\[Metla\]](#) [\[Main Index\]](#) [\[Thread Index\]](#)

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