

防雪林の安定的な防雪性能確保に関する研究

A Study on Securing Stable Snowbreak Performance for Snowbreak Woods

吹雪対策として高い効果が期待できる防雪林は、苗木で植栽するため継続的な育成管理が必要となっています。防雪林では成長を遂げ一定の防雪機能を発揮した後も吹雪抑止のため適切な時期に樹木の間引きを行って、下枝を維持する必要があります。しかし「間引き遅れ」により、防雪機能の低下が懸念される事例が出始めています。

そこで本研究は、下枝の枯れ上がりによる防雪機能等への影響を明らかにして、間引き遅れの防雪林に対する対策技術や、防雪林の生育段階に応じた管理手法を提案することで、安定的な防雪機能を有する防雪林の構築、機能向上を目指します。

Snowbreak woods are thought to be highly effective at mitigating blowing snow. The growth of such woods must be managed continuously, from the planting of seedlings to the growth maintenance of grown trees. The trees take a certain amount of time to exhibit their effectiveness in controlling blowing snow. And even after that, it is necessary to thin the woods at appropriate intervals in order to maintain the health of lower branches so that the woods can maintain their effectiveness. In some cases, concerns have arisen about decreased snow control effectiveness from belated thinning. This study aims at snowbreak woods that maintain their snow control effectiveness and that have improved snow control. Technical measures for snowbreak woods which undergo belated thinning and a management method based on the growth stage of the woods were proposed based on clarification of the influence of the death of lower branches on the wood's snow control function.



▲生長を遂げた防雪林
Fully grown snowbreak woods

防雪林における課題

Issues related to snowbreak woods

道路防雪林は、1977年に北海道で初めて造成されました。それから40年以上が経過し、初期に造成された防雪林では10mを超える高さにまで生長しています。

大きく育った防雪林では、下枝が枯れ上がっているものがあり、風雪の吹き抜けが懸念されはじめています。

The first road snowbreak woods in Japan were developed in Hokkaido in 1977. More than 40 years later, the trees in woods dating from the early period of road snowbreak woods development have grown to exceed 10 m in height. In fully grown snowbreak woods, some trees have dead lower branches. The concern has arisen that such woods are less effective at controlling snow.



▲下枝が枯れ始めている防雪林
Snowbreak woods where the lower branches of trees have started to die

樹木の成長と枝葉の枯れ上がり

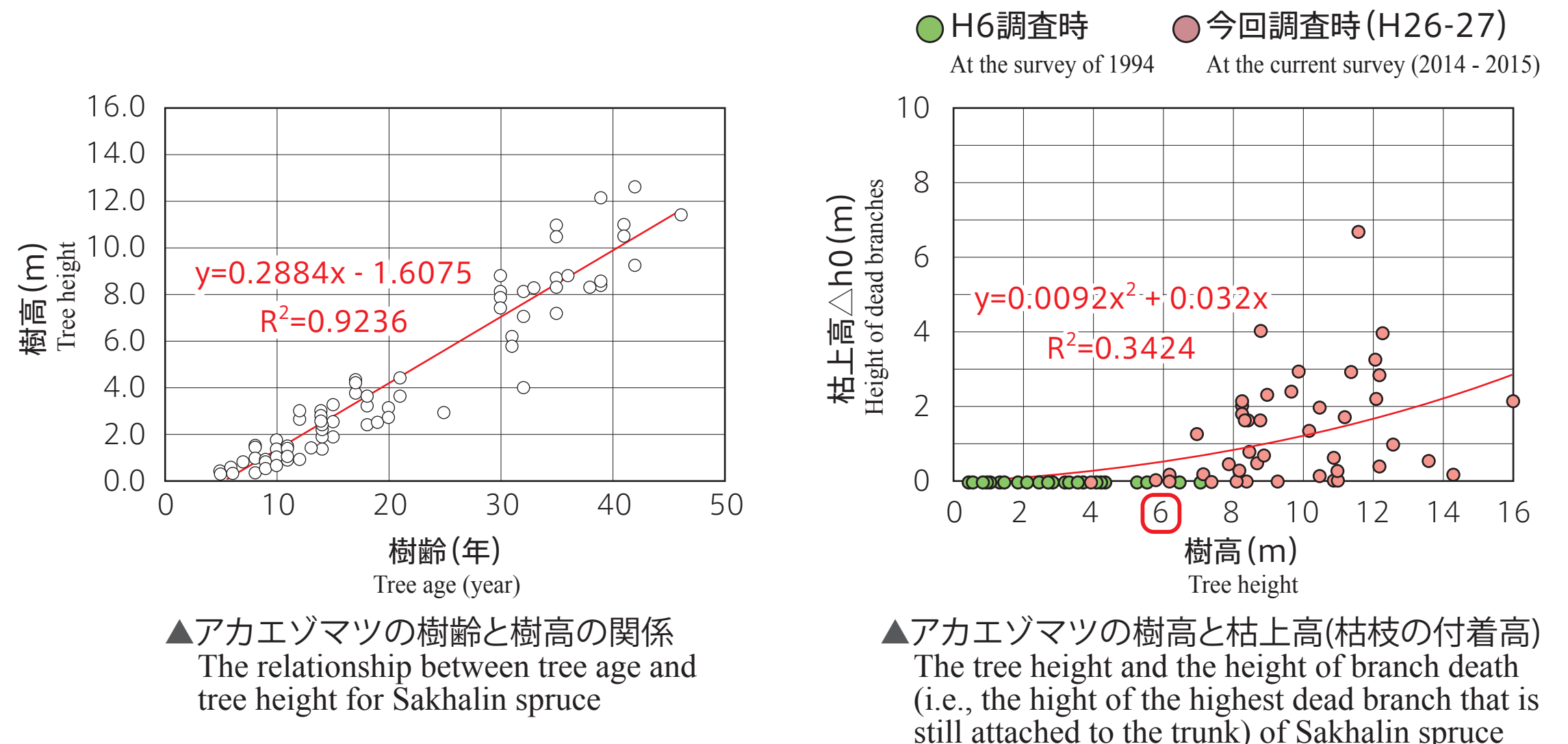
The growth of trees and the death of lower branches and leaves

生長を遂げた全道の防雪林50箇所ですべて樹木寸法を計測し、過去の調査事例と統合して、樹木の成長実績や枯れ上がりの状況を調査しました。

その結果、防雪林の代表木であるアカエゾマツでは樹齢27年で樹高が6mに達します。この樹高になると枝張径も2mを超えて枝が隣接木と接触し、陽光不足によって下枝の枯れ上がりが始まることが分かってきました。

The growth of trees and the death of lower branches in snowbreak woods were surveyed in Hokkaido. Tree dimensions were measured in 50 full-grown snowbreak woods in all areas of Hokkaido. The measurements were compared with those of previous surveys.

The survey found that Sakhalin spruce (*Picea glehnii*) grow to 6 m in height by the age of 27 years, that the branch spread of Sakhalin spruce of that age exceeds 2 m in diameter, and that the death of lower branches starts because such branches touch the branches of neighboring trees and lack of sunlight.



枝下における風雪の吹き抜け

Wind and snow blowing through the lower branches

下枝の枯れ上がった防雪林において、風速や吹雪量の測定を行いました。

その結果、枝葉がついている高さ7mでは、風上に比べて防雪林内で風速が4割以下に低下していますが、枝葉が抜け落ちている低い高さ(0.5m~3.0m)では6割程度に留まっています。

一方、吹雪量では林内を通過するに伴って徐々に少なくなっている様子がわかります。今後観測事例を増やししながら、メカニズムの解明を進めます。

Wind speed and snow transport were measured at a snowbreak woods whose lower branches were dead. At the height of 7 m, where the branches had twigs and leaves, a reduction of about 60% or more in wind speed from that measured on the windward side of the woods was observed; however, the reduction in wind speed from that of the upwind side of the woods to that at several measurement points in the woods was about 40% at the low height (0.5 m - 3.0 m), where the branches did not have any twigs or leaves.

It is understood from the graph that the snow transport gradually decreases with progress of the wind through the woods. We will continue to investigate more observation cases and clarify the relationship between the dead lower branches and the reductions in wind speed and snow transport.

