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PREDICTING THE FUTURE GROWTH OF HYBRID POPLAR ACROSS SOUTHERN SASKATCHEWAN

No. SASK-49

by BROOKE HOWAT

We wanted to predict how shelterbelt trees will grow in the future under different climate scenarios. To do so, we sampled tree cores from four different shelterbelt species across 68 sites in the Brown, Dark Brown, and Black soil zones of Saskatchewan (Figure 1). The four shelterbelt species we sampled in this study were green ash, hybrid poplar, white spruce, and Scots pine.

All Tree Species **Hybrid Poplar Species**

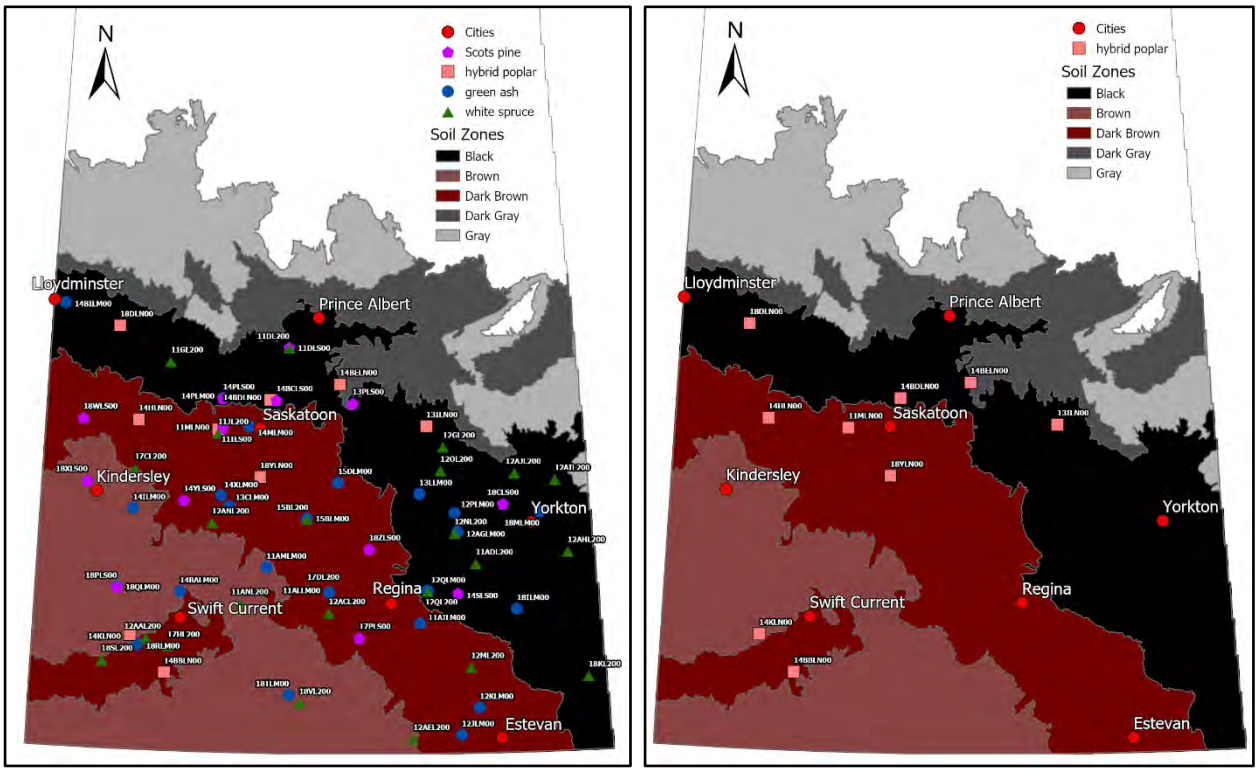

Figure 1. Locations where all four tree species were sampled, and the locations where all the hybrid poplar species were sampled across southern Saskatchewan.

Predicted the Future Growth of Hybrid Poplar

The most influential climate variables controlling the variability in hybrid poplar radial growth were previous August temperature, current May temperature, current June precipitation and temperature, and previous September precipitation. Other studies have found similar results that hybrid poplar growth is mainly driven by the previous growth season's late summer and early fall precipitation and temperature. The level of soil moisture in the late summer and early fall of the previous growth season determines the amount of carbohydrate reserves that can be stored to drive growth in the following season (Figure 2). Saskatchewan is semi-arid, meaning that the low precipitation and high temperatures typical of Saskatchewan (low soil moisture) likely limit the carbohydrate reserves that can be stored in the fall to drive hybrid poplar diameter growth in the following spring.

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Once the carbohydrate reserves are depleted in the spring of the following growing season, hybrid poplar must depend upon good soil moisture in the spring and early summer. Figure 3 shows that hybrid poplar is expected to experience slight decreases in radial growth across most of southern Saskatchewan. However, if landowners were to maintain and water their hybrid poplar, they may be a suitable species to plant across most of southern Saskatchewan.

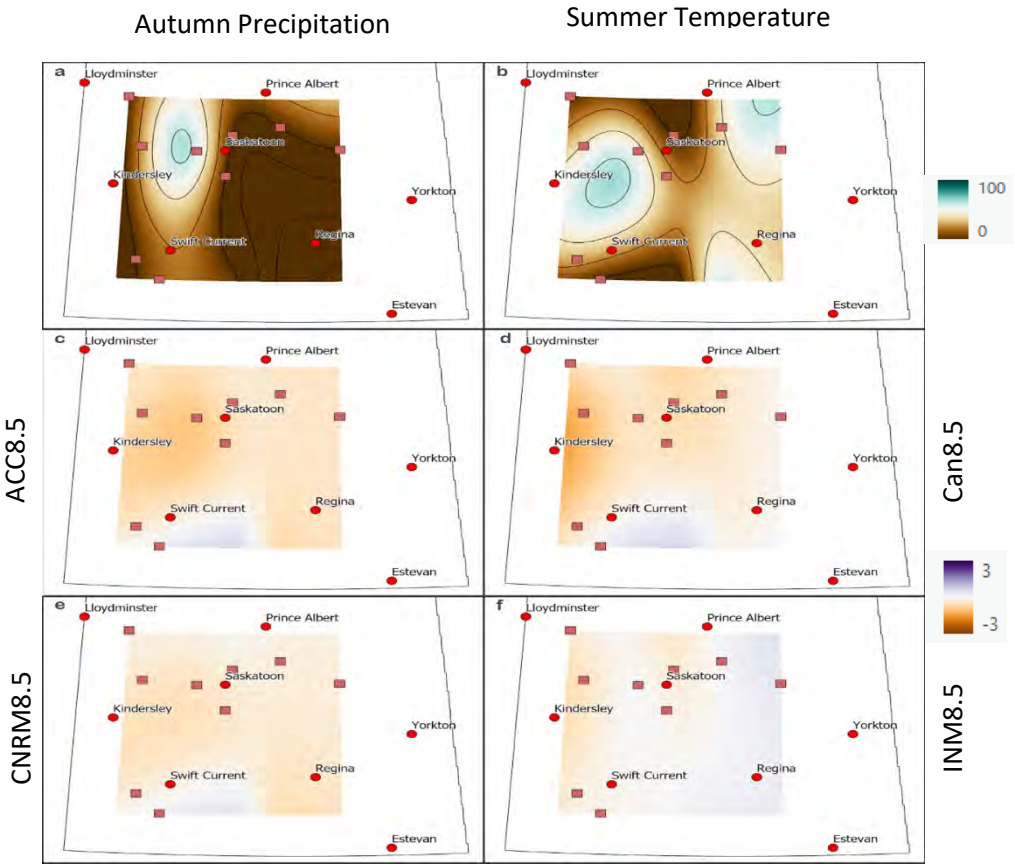

Figure 2. Autumn precipitation and summer temperature relative weights maps identify areas where these climate variables have the highest influence in the southern half of Saskatchewan (maps a and b). The blue areas in the relative weights maps indicate that the climate variable has a large influence on hybrid poplar growth in that area of the province. The four maps below the relative weights maps (maps c, d, e, f), predict changes in hybrid growth for four climate models under a high emissions scenario (RCP 8.5) in the year 2100. The brown colour that covers most of maps c, d, e, f indicates that hybrid poplar radial growth is predicted to decrease in the future.

Further Reading

https://harvest.usask.ca/handle/10388/13164

Contact for More Information: SASKAGROFORESTRY.CA/

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