

Differences between Forecaster and Spreadsheet Implementation of 300 Index Model

The following are differences between the Forecaster implementation and the Visual Basic implementation (i.e. spreadsheet):

1. **The Forecaster implementation calculates stand volume by summing the volume of each of the stems which comprises the stand rather than using a stand volume function.** Each stem's volume is calculated using a tree volume and taper function. This was done so that stand volume was consistent with log product volume if yield tables are produced. This means volume reported by the spreadsheet and by Forecaster will differ.
2. Forecaster derives mean top height from the stem list from first principles i.e. by fitting a height/diameter regression then using it to find the height of the tree of mean top diameter. The spreadsheet implementation uses a stand level function to convert mean height to mean top height (and vice versa). The implications of this are :
 - i. **Mean top height following a thinning in Forecaster may differ from the spreadsheet.** Mean top height may increase or decrease immediately following a thinning (due to the height/diameter relationship being different pre and post the thin). If the mean top height has increased, then during subsequent annual growth half the average annual height increment is added until the mean top height reaches the height predicted by the height/age curve. This avoids a negative height increment during growth following a thinning.
 - ii. **Forecaster apportions height growth to individual stems in such a way that mean top height is consistent with the mean top height** predicted by the stand level predictions of the VB implementation. This means the individual stem heights predicted by Forecaster will differ from the VB implementation.
3. In Forecaster, if a **site index** is used which gives a different mean top height from that entered at the measurement age, then Forecaster calculates the difference between the predicted and entered values and adds this difference (or "**offset**") to all predictions. This means that the predicted mean top height at the measurement age is the same as the entered value, but that the mean top height at age 20 is different from the site index entered (as it will have had the "offset" added to it). The opposite is true in the VB implementation i.e. the predicted mean top height will not pass through the measured height, but the mean top height at age 20 will be equal to the site index entered.
4. When calculating the 300 Index in Forecaster from a measurement which is post a thinning, Forecaster will **assume the thinning is from below** and use the default thinning coefficient used in the spreadsheet (i.e. 0.78) . If the thinning was not from below then 300 index calculated will not be correct.
5. When calculating the 300 Index in Forecaster from a measurement which is post a pruning, Forecaster will **assume the mean pruned height is 0.2m less than the maximum pruned height specified in the pruning event** in the crop's history. The actual mean pruned height achieved may well differ from this assumption.