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| **Table 4.** Dominant and co-dominant trees associated with goldenseal in Pennsylvania along with indicator species analysis (ISA) results. | | | | | |
| **Scientific name+** | **Common name** | **% of plots and (n)** | **ISA variables** | | |
| **Prov** | **Ca** | **pH** |
| *Liriodendron tulipifera* L. | Tulip-poplar | 40 (23) | P\*\* |  | AO\*\* |
| *Acer saccharum* Marshall | Sugar maple | 38 (22) |  | AO\* | O\* |
| *Juglans nigra* L. | Black walnut | 22 (13) | RV\*\* |  |  |
| *Carya cordiformis* (Mill.) K. Koch | Bitternut hickory | 16 (9) |  |  | AO\*\* |
| *Quercus alba* L. | White oak | 16 (9) |  |  |  |
| *Quercus rubra* L. | Northern red oak | 16 (9) |  |  |  |
| *Carya glabra* (Mill.) Sweet | Pignut hickory | 14 (8) | P\*\*\* |  | AO\*\*\* |
| *Prunus serotina* L. | Black cherry | 12 (7) | AP\*\* |  |  |
| *Tilia americana* L. | American basswood | 10 (6) |  |  |  |
| *Carya tomentosa* (Poir.) Nutt. | Mockernut hickory | 9 (5) | P\*\* | O\* | AO\*\* |
| *Carya ovata* (Mill.) K Koch | Shagbark hickory | 9 (5) |  |  |  |
| *Ulmus rubra* Muhl. | Slipper elm | 9 (5) |  |  |  |
| *Acer platanoides* L. *\** | Norway maple | 5 (3) | AP\*\* |  |  |
| *Fraxinus pennsylvanica* Marshall | Green ash | 5 (3) |  |  | AO\* |
| *Quercus montana* Willd. | Chestnut oak | 5 (3) |  |  |  |
| *Fagus grandifolia* Ehrhart | American beech | 5 (3) |  |  |  |
| Only associates occurring on 5% or more research plots are given (n = 58 plots) | | | | | |
| Monte Carlo test of significance P-values: \* P ≤ 0.10, \*\* P ≤ 0.05, \*\*\* P ≤ 0.01 | | | | | |
| Prov: P Piedmont, RV Ridge and Valley, AP Appalachian Plateau | | | | | |
| Ca: below optimum (BO) (<1400 ppm), optimum (O), and above optimum (AO) (>2100 ppm). | | | | | |
| pH: below optimum (BO) (<6.0), optimum (O), and above optimum (AO) (>7.0). | | | | | |
| Thresholds for calcium and pH were set based on recommendations by the PSU Agricultural Analytical Services Laboratory for maintaining mixed species woodlots. | | | | | |
| Asterisks (\*) denote non-native, exotic species. | | | | | |
| +All taxonomy follows Weakley, 2023. | | | | | |