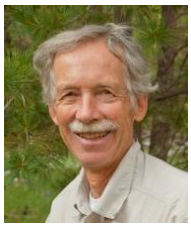
A Search for Browse-Resistant Aspen



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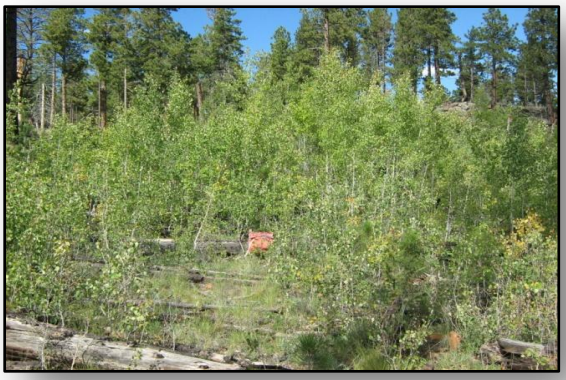
Here and there on the Coconino National Forest, stands of young aspen thrive. No fence, no steep slope, no especially rocky terrain, and no natural jack-strawing from a jumble of knee-high fallen aspen.

This photo illustrates such a site.



Friends of Northern Arizona Forests (FoNAF) asked itself, could these genotypes possess natural resistance to browsing by elk and deer, perhaps because they have high concentrations of bitter chemicals (such as salicin)? More importantly, if we could generate saplings with the very same genome and then plant them elsewhere on the forest, would the saplings resist browsing and thrive? We set out to answer that question.

In the years 2011-2014, FoNAF collected 119 roots from six locations within 20 miles of Flagstaff and at elevations ranging from 6850′ to 8750′. After a disastrous first year in a respected greenhouse, we turned to the Research Greenhouse of Northern Arizona University. Phil Patterson skillfully produced some 2,000 saplings—many a meter tall—from 86 different roots.

In the years 2013-2015, FoNAF planted at three test sites: 347 “control” saplings went into exclosures, and 745 “test” saplings were planted outside. For a year, we provided protective cones and mesh sleeves—to facilitate root growth despite a tendency for elk to pull up plants wantonly. Then the protection was stripped off in mid-July, and the real test began.

In August 2016, I made inventories of each test site. The criterion for a “healthy sapling” was “leaves all the way to the top of the original stem.” By that standard, the 2013-2015 controlled exclosures showed healthy saplings at percentages of 26%, 82%, and 67%.

The next photo shows a crew watering the 2013 planting and illustrates the scale of the

project.
In contrast, I could not find a single healthy sapling among the 745 test saplings. Those saplings were in one of three conditions:
(1) heavily browsed, (2) stem dead or heavily browsed, but some leaves at the base, or (3) just plain dead or missing.

FoNAF had set out to answer the question, if we could generate saplings with the very same genome and then plant them elsewhere on the forest, would the saplings resist browsing and thrive? The results of the study provide a clear answer: No. That's not the answer that we had hoped for, but at least it's unequivocal. Our results from all three test sites show that elk and deer would destroy any saplings from the 86 roots that we tested if those saplings were planted on a landscape scale on the Coconino NF.

Here's another way to state the outcome. The apparent resistance to browsing that the genotypes show in their original sites does not carry over to planting at other sites on the national forest.
Of course, one then wonders what provides the "apparent resistance to browsing" in the original sites. Suggestions have been offered, but I will avoid speculation and will propose no explanation here.