

RECENT DEVELOPMENTS IN THE MANAGEMENT OF PROBLEM FOREST WEEDS

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Competing vegetation has the most critical influence on plantation establishment and growth. Inevitably, some species are harder to control than others, and for decades have posed a challenge to foresters. Advances in product development and application technologies have increased both efficacy and efficiencies in chemical vegetation management. However, for years certain species have continued to be problematic, especially in established plantations where due to phytotoxicity issues, chemical choices are more limited.

Golden chinquapin, snowbrush and tanoak have predominately been the most problematic species of concern. Triclopyr and 2,4-D have provided short-term control, but due to re-sprouting one to two years after treatment, multiple treatments are usually necessary. With the registration of imazapyr in California, finally a treatment option was available to control these species without any re-sprouting problems. However, ponderosa pine, Douglas fir, and white fir have a very low tolerance to imazapyr and applications were limited to site preparation treatments. Often after logging, the vegetation is too disturbed to use chemical treatments prior to planting. The result is that vegetation treatments revert back to release mode and exclude imazapyr from the equation. Simply, a more effective way of treating the vegetation was required.

The answer to effectively controlling these problematic weeds was found in chemically treating the vegetation one to two years prior to logging. Pre-harvest chemical applications have proven to be the most effective and efficient method in providing cost effective long-term control of problematic species. The applications are primarily applied by ground, but there is potential for aerial applications.

There are many benefits to treating the vegetation in this fashion. The vegetation is in an undisturbed state, with full crowns and undamaged root systems. Efficacy and chemical efficiencies are both maximized. The vegetation is also in a semi-stressed state due to shading of overstory conifers. Although there is no quantitative proof, it appears that vegetation in an understory setting is easier to control than open grown brush.

A second advantage is that conifer tolerance is not a large issue due to the length of time between treatment and planting. This allows for all chemicals registered for forestry use to be considered. Imazapyr products can now be used to effectively achieve long-term control of difficult species. Overall, the forester can target the competing vegetation with the most effective chemical prescription without the worry of conifer injury.

Third, labor costs are extremely cheap compared to release applications. The hand crews do not have to worry about spraying seedlings accidentally and can apply the product in a broadcast fashion. Several methods of application can be employed. Waving wand, floodjet and conventional broadcast applications can be utilized in stands where there is a minimal risk of interception by non-target understory conifers. When understories are crowded with small sub-merchantable conifers or have many pockets of larger brush which may cause shadowing on other target brush, directed applications or a combination of directed and broadcast applications can be utilized. With imazapyr, low volume (3 to 5 gallons per acre) treatments can be used, reducing costs even further.

The most important benefit from pre-harvest treatments is the reduction in follow-up treatments needed. By being able to utilize chemicals that completely control tough to kill vegetation and eliminate sprouting, release treatments in the long-term are dramatically reduced.

Pre-harvest treatments are also not limited to brush species. Mature hardwoods can also be effectively controlled with hack and squirt applications, usually with imazapyr. Labor costs are usually cheaper with hack and squirt applications compared to treating re-sprouts in a release application. Usually one year after treatment is required before cutting treated hardwoods to insure no re-sprouting occurs.

An indirect advantage of using imazapyr as a pre-harvest treatment is that there is usually (depending on soil type and rainfall) a fair amount of soil residual activity. The lingering effect produces varying levels of grass and forb control as well as inhibiting seed germination of competing brush species. Hence, this allows for reductions in the rates of post-logging residual herbicides such as hexazinone, atrazine or sulfometuron.

Another indirect effect applies to units where fall planting is planned. Controlling the vegetation prior to logging allows for a completely clean and vegetation free site once the logging is completed. Where fall planting is planned, logging can be scheduled early in the season to allow treated units to sit fallow through the summer, thereby maximizing the amount of available soil moisture. Significant differences have been noticed between units that were pre-treated and units that were not as far as the amount of soil moisture retained at the end of the growing season.

There is also potential for aerial applications in a pre-harvest setting. To date, aerial applications have been fairly limited to under-stocked stands that are fairly open and have large heavy brush which is too difficult to walk through. Shadowing effects from standing conifers can be minimized by cross-flying the stand in two directions. Operational efforts to date have been extremely successful. Logging must be completely within several months of application however, to reduce the potential for blue stain in ponderosa pine.

Imazapyr alone and imazapyr/glyphosate tank mixes are the most versatile and effective treatment for most vegetation complexes in the sierra cascade region. In all cases with imazapyr, esterified seed oils are required to increase efficacy of applications. The esterified seed oils have proven to be the most effective adjuvant when compared to non-ionic or silicone based surfactants when treating evergreen brush with imazapyr (Ditomaso et. al, 2004). Formulation of imazapyr used is critical to efficacy depending on the species treated. Evergreen brush should be treated with Chopper which is both oil and water soluble. Arsenal, the water soluble formulation of imazapyr is mainly used for hack and squirt treatments. Either formulation may be used for deciduous brush. Pre-harvest treatments are also not limited to imazapyr or glyphosate. Other products may be more desirable depending on target vegetation present. The primary goal is to use the most effective product for the species present.

The use of pre-harvest site preparation does have its complicating factors. Logistical planning with the logging side is critical. Treatments must be planned to coincide with logging schedules. Another complication is road access. Road construction and re-construction associated with harvest plans must be done earlier in the process to allow access to the hand crews. Any special treatment areas such as stream protection zones, habitat retention areas and archeological sites have to be flagged out ahead of time if understory vegetation is to be retained. Fuel loading is also a concern. The stands will be logged with a completely dead understory of dry brush. Fire starts due to logging activity may be of concern.

In conclusion, pre-harvest site preparation has solved some difficult vegetation management problems. While controlling hard to kill species, pre-harvest treatments have also decreased

application costs, reduced the overall chemical use, increased available soil moisture and solved several conifer tolerance issues. The most important factors to consider when planning pre-harvest applications are logging schedules, road access, chemical prescriptions, application method, unit and special treatment flagging and obtaining a high quality crew with an experienced foreman. Pre-harvest applications are a recent and vital tool in growing healthy forests.

Bibliography

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