Community Forestry Assistant

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Diversity is Key – the Dangers to Planting Monocultures

A monoculture is a planting of one species in a large area. It is both efficient and productive to grow monocultures of a crop that is seasonal and of high value. On the other hand, use of monocultures comes with risk. If a pathogen, insect, or environmental stress becomes a problem, the entire planting is threatened. Southern corn leaf blight was devastating to corn in the 1970s. We have also seen problems such as the death of most elms from Dutch elm disease in the late 1900s or losses from chestnut blight in the early part of the last century. The common practice of planting a single type of tree along a street or park unfortunately created favorable conditions for the spread of Dutch Elm disease in the American elm. The image shows a monoculture of elms planted along a street in the 1950s, all of which were eventually killed by Dutch elm disease.

Other established pathogens, such as pinewood nematode, the oak wilt fungus, and *Verticillium* (wilt), preclude the use of monocultures in city plantings. In addition, there are new pathogens of concern, such as the *Phytophthora* species that causes sudden oak death or the bacterium that causes bacterial leaf scorch. The same concerns exist for insect threats such as emerald ash borer and mountain pine beetle.

Rotation of crops is one method of avoiding some risk associated with monoculture. A year of corn production is followed by a year of soybeans, then corn, then soybeans, to avoid many disease and insect problems. This method works with many vegetables, annuals, and even some perennials. Rotation, however, is obviously not feasible with established trees.

Many municipalities have diversity guidelines for planting trees such as no more than 10% of a single species, no more than 20% of any genus, and no more than 30% of any tree family. Nevertheless, other considerations may make these guidelines impractical including a specific species' adaptation to the target site, tree availability, or a need to plant trees with a particular size or growth habit. Imposing strict planting percents may result in planting species that are not as well adapted to that site.

In any planting, whether it be agronomic crops or urban trees, movement toward monoculture increases the likelihood of future problems. Monoculture is the biological equivalent to putting all your eggs in one basket. If an insect or disease problem becomes prevalent, the entire planting is in jeopardy. The dangers of monoculture are well known . Dutch elm disease on American elms, cankerstain on planetree, and obscure scale on red oaks are all examples of dangers to monocultures. In species diversity is safety. It is a way of hedging your bets with nature.

Species diversity is not only biologically and horticulturally important, but it can also have aesthetic advantages. Urban areas are far too often devoid of rich gardenesque plantings. City dwellers cherish those plants which dramatically announce the changing seasons. Diverse plantings provide multiple seasons of flowers as well as contrasts in form, texture, fruit and autumn color. Naturally, diversity in any one planting must be tempered with some level of repetition to bring unity to a planting. Yet when done carefully and sensitively, a surprising level of diversity can be incorporated into a planting without sacrificing design unity. Consider natural plant systems such as a forest or a meadow. Each are richly diverse plant communities, yet they present a unified, pleasing appearance.

If you have questions about this newsletter or the Community Forestry Assistance Program, please contact Tera King with Northwest Management, Inc. at 208-883-4488 ext. 133.