

# CHARACTERISTICS OF EXOTIC PEST PLANTS

Daniel R. Spuhler\* and John Harrington

Department of Landscape Architecture

University of Wisconsin

1450 Linden Drive

25 Ag Hall, Madison, WI 53706

Ph: (608) 278-9331

\*Corresponding author

**ABSTRACT:** We compiled 22 characteristics of exotic pest plants from a number of sources. From generalized pollination systems and effective seed dispersal mechanisms to high reproductive rates and rapid growth, exotic pest plants share many characteristics. Explanations or examples provide a better understanding of each of these characteristics for people interested in exotic pest plant species management.

*Key words:* exotic pest plants

## INTRODUCTION

Many of the exotic pest plants present in our remnant native communities were brought here from Europe and other parts of the world as ornamentals or contaminants in agricultural seed (Mack 1990). It is also well known that conservation agencies have used exotic species widely for wildlife habitat and soil conservation (Dantonio and Vitousek 1992, Harty 1986). Despite added assurances during initial promotion, multiflora rose (*Rosa multiflora*), autumn olive (*Elaeagnus umbellata*), bush honeysuckle (*Lonicera tartarica*), Amur honeysuckle (*L. mackii*), and many other species, have become nuisances (Harty 1986).

Not only can exotic species contribute to the degradation of the landscape, but they may be harmful to livestock and lead to economic losses. For example, leafy spurge infests 1.2 million acres of rangeland in North Dakota alone, and results in estimated annual losses of nearly \$9 million (Cheater 1992). Tall fescue (*Festuca arundinacea*) now occupies more than 35 million acres in the U.S. and results in losses up to \$1 billion annually of both rangeland and livestock (Ball et al. 1993).

Represented above are only two of many exotic pest plant species, and the estimated annual losses from these two species amount to \$1.9 billion. This dollar estimate does not, however, include the cost of controlling these pests. If the costs for the number of work hours and other logistical support (e.g., herbicides, fuel) were added to the above figure, the realized economic loss alone would be much greater.

Exotic species share many characteristics. By reviewing the literature, we have developed the following list of characteristics of exotic species to provide restorationists, land managers, ecologists, and others interested in exotic pest plants a background and understanding of these plants.

## Characteristics of Exotic Pest Plants

- 1) **Similarity in climate, soils, and lifeform** — Many exotic species survive and spread because conditions in North America are similar to those in their land of origin (Wagner 1993).
- 2) **Generalized pollination systems** — Many exotic species have simple pollination systems and do not require a narrow range of environmental conditions or a specific pollinator to become fertilized (Newsome and Noble 1986).
- 3) **Effective seed dispersal mechanisms** — Many exotic species have barbed structures on their fruits, are very palatable to wildlife, or, are readily used by man, which ensures effective dispersal (Wagner 1993, Mack 1992, Werner 1992, Newsome and Noble 1986).
- 4) **Effective breeding systems** (i.e. facultative apomixis, agamospermy) — Many exotic species are capable of asexual reproduction, i.e. do not require cross-fertilization, or reproduce vegetatively (Wagner 1993, Newsome and Noble 1986).
- 5) **High interspecific competitive ability** — Many exotic species can out-compete and reduce or

eliminate more desirable native species (Newsome and Noble 1986).

6) **High intraspecific competitive ability** — Many exotic species can withstand and surmount high densities of themselves (Newsome and Noble 1986).

7) **High reproductive rates** — Many exotic species produce numerous seeds (> 100,000 for *Lythrum salicaria* per plant per year) or vegetative offshoots compared to native counterparts (Armine and Stasny 1993, Thompson 1987, Newsome and Noble 1986).

8) **Rapid growth** — Many exotic species can grow very fast and soon over-take or shade more desirable native species (Cronk and Fuller 1995, Newsome and Noble 1986).

9) **Environmental plasticity (growth)** — Many exotic species are tolerant of broad ranges of environmental conditions (Mack 1992, Newsome and Noble 1986).

10) **Environmental plasticity (reproduction)** — Many exotic species can flower and set seed under broad ranges of environmental conditions or when very small or very large.

11) **High speed reproduction** — Many exotic species can grow, flower, and set seed in a very short period of time, resulting in the production of several generations in one growing season (Newsome and Noble 1986).

12) **High pollen and seed viability** — Many exotic species produce pollen and seeds which remain viable for great lengths of time (many years) increasing opportunities for successful reproduction (Newsome and Noble 1986).

13) **Few threats** — Many exotic species have escaped from fungi, diseases, parasites, insect predators, and other herbivores which controlled their growth and reproduction in their homeland, and without these controlling mechanisms with which to contend in North America, they can grow rampantly (Mack 1992, Janzen 1986).

14) **Disturbance** — Many exotic species are associated with disturbed habitats, e.g., disturbed soils and removal of a natural process from a community or ecosystem (Cronk and Fuller 1995, Wagner 1993, Janzen 1986, Swincer 1986).

15) **Long distance traveled** — Many exotic species are far from their original homeland (Wagner 1993).

16) **Only a few within a genus are actually a problem** — One or few species within a taxonomic genus are actually invasive even though the genus may be species rich (Wagner 1993).

17) **Still a weed** — Many exotic species are considered pests in their homeland (Wagner 1993).

18) **Go forth and multiply** — There is little solid evidence that invasive populations will ultimately come into equilibrium with their new associates and then function as nonaggressive members of their communities (Wagner 1993).

19) **Change in biodiversity** — Many exotic species may affect biodiversity at the same trophic level; the trophic level above and/or the trophic level below (Pimm 1986).

20) **Delayed high reproduction** — Many exotic species may not appear to be a problem for many years, but may eventually adapt sufficiently to become naturalized and spread into the landscape (Wagner 1993).

21) **Tolerant of defoliation** — Many exotic species have a great tolerance for partial defoliation and grazing (Armine and Stasny 1993).

22) **Tolerant seeds and seedlings** — As with adult plants, the seeds and seedlings of many exotic species are tolerant of broad ranges of environmental conditions (Newsome and Noble 1986).

## CONCLUSIONS

Not all invasive exotic plants have all of the above characteristics. However, experience has shown that a great many invasive species harbor several of these characteristics. That is why we often have a difficult time controlling those species in a short period of time. Hopefully restorationists, land managers, ecologists, and others interested in exotic pest plants will find this list useful; perhaps as a tool to support legislation to restrict the import and sale of invasive exotic species.

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