

Invasive Plants Models

Given the following data, create exponential growth models:

1. Knapweed: Knapweed was introduced from Eurasia in the early 1900s. Since Knapweed has no naturally indigenous enemies or parasites in North America, it rapidly spread across the province. Knapweed is easily distributed great distances by being caught up and transported in the under carriage or doors of recreational vehicles, trains, light air craft landing at infested airstrips, logging trucks, and heavy machinery.

One hundred knapweed seeds are dropped in an area. A knapweed plant produces 1000 seeds per plant. Four percent of knapweed seeds in the seedbank germinate (sprout) each year, leaving 96 percent for next year's seedbank. About 25 percent of the seedlings that sprout survive to become mature plants. Knapweed seeds remain viable in the soil for 8 years. It takes 1 year for knapweed to germinate and produce seed. Knapweed plants live for 5 years. How many plants and seeds will there be after 10 years?



2. Russian Thistle: Brought to South Dakota in 1873 by Russian immigrants as a contaminant in flax seed. Also called tumbleweed, this weed quickly establishes itself in disturbed areas of ground (vacant lots, agricultural fields, roadsides, fence lines), especially where the soil is soft.



A single large tumbleweed can produce 200,000 seeds. temperatures of between 52 and 90 degrees Fahrenheit, all of these seeds, with a minimum of moisture (.3 inches of rainfall) can germinate in as little as 30 minutes. The plants live for one year, breaking off and rolling along the ground for miles as they disperse their seeds. Seeds remain viable in the soil for up to 3 years. How many plants and seeds will there be after 10 years? If a large tumble