Management of Nitrogen in the Mountain States

The management and use of N in the Rocky Mountain states varies considerably, because the geographic area is very diverse. The agriculture production area varies in elevation from about 42 m (140 feet) along the Colorado River in Arizona to over 3000 m (10 000 feet) in the mountain meadow areas of the Rocky Mountains; annual rainfall varies from 10 cm to \( > 76 \text{ cm} \). Great land areas of native grass, sagebrush \( (Artemisia tridentata \text{ Nutt.}) \), timber, and improved grassland occur throughout the Mountain states area and the area of agricultural land is relatively small. Alfalfa \( (Medicago sativa \text{ L.}) \), corn \( (Zea mays \text{ L.}) \), sugarbeet \( (Beta vulgaris \text{ L.}) \), small grain, cotton \( (Gossypium hirsutum \text{ L.}) \), potato \( (Solanum tuberosum \text{ L.}) \), vegetable, and citrus crops are grown under irrigated conditions—both furrow and sprinkler. Alfalfa, small grains, and corn are grown in all these states, while other crops are more area specific. For example, citrus and cotton production is isolated in areas where the climate is warmer, and sugarbeet production is isolated in areas close to processing plants. Fruits such as apples \( (Malus sylvestris \text{ Mill.}) \), peaches \( [Prunus persica \text{ (L.) Batsch}] \), pears \( (Pyrus communis \text{ L.}) \), apricots \( (Prunus armeniaca \text{ L.}) \), and cherries \( [Prunus avium \text{ (L.) L.}] \) are grown in isolated areas of Colorado, New Mexico, Idaho, and Utah and contribute significantly to the local economy.

Wheat \( (Triticum aestivum \text{ L.}) \) is the only major crop grown under non-irrigated (dryland) conditions in this region, although barley \( (Hordeum vulgare \text{ L.}) \) is an important dryland crop in Idaho and Montana. Dryland small grain production is generally restricted to rainfall areas of 33 to 68 cm annual precipitation. It is generally grown under summer-fallow cropping, where the land is left uncropped and maintained weed-free for one growing season. This facilitates the accumulation and storage of moisture in these low-rainfall areas and also provides a time period for mineralization of plant nutrients. The major summer-fallow area is the western edge of the