

LIFE CYCLE AND GROWTH HABITS OF YELLOW FOXTAIL

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Yellow foxtail [Setaria lutescens (Weigel.) Hubb.] probably originated in Europe and from there was introduced to North America in the 19th century. It is found throughout the continental U. S. and Canada and is present in Mexico.

Yellow foxtail is a cropland weed, surviving only on arable land. It can be a major weed problem in soybeans, sugarbeets, corn, grain sorghum, sunflowers, small grains in the northern states, and in irrigated alfalfa in California.

Yellow foxtail is also known as Setaria glauca (L.) Beauv. but the Weed Science Society of America gives Setaria lutescens (Weigel.) Hubb. as the 'official' name for the species.

Yellow foxtail is a rapidly growing warm-season annual. It branches profusely, bears upright or prostrate stems, and has a fibrous root system. The plant grows vigorously under warm conditions (75 to 95 F) and makes little growth at temperatures below 60 F. The first frost in the fall generally kills the plant.

Morphologically distinct biotypes of yellow foxtail occur in the U. S. Some forms are prostrate while others are upright. Forms with the upright growth habit are common in the midwest and eastern U. S. but the prostrate forms are most common in alfalfa grown in California.

Yellow foxtail varies in height, generally growing from 12 to 16 inches tall but grows considerably taller in tall crops. The leaves range from 8 to 20 inches long and vary in width from 1/4 to 1/2 inch. The leaves may be smooth or glaucous (waxy) and sometimes exhibit a tinge of purple coloration. The auricle is absent at the junction of the sheath and leaf blade; the ligule is represented as a ring of fine hairs.

In California, yellow foxtails begins flowering in late May and June but is influenced by the season and geographic area. The plant bears an erect, single, 1-1/2 to 4 inch long spike-like panicle on each flowering stem. Typically, a plant produces 20 to 50 heads, each with numerous bristles on the stem at the bases of the spikelets. Indeed, one of the common names for the species is bristle grass.

Seed set commences about mid-summer and continues until the plant is killed by frost. From 20 to over 70 seeds are produced per head, depending on growing conditions. Over 6,000 heads with a potential seed set of over 400,000 seeds have been recorded per square meter. Alfalfa has been shown to reduce the seedheads of yellow foxtail by about 50%. Depending on the density of the alfalfa and the weeds, seed production of yellow foxtail was reduced by 70% to 90%. However, the survivors are still capable of producing up to 50,000 seeds per square meter.

Most small seeded annual grasses do not possess great longevity and this also appears to be true for yellow foxtail. About 70% to 80% of the seed produced by yellow foxtail will germinate the following year with 10% germinating in the second and third year. After 5 years, less than 1% of the seed remains viable. Burial 4 to 6 inches deep increases longevity of the seed. A yellow foxtail weed problem could be reduced by preventing the weed from going to seed and preventing reinvasion.

When shed from the plant, typically less than 10% of the seeds will germinate under laboratory conditions. The dormancy is probably due to inhibitors present in the seed coat. As after-ripening occurs, the germination percentage slowly increases. Dormancy is lost over a period of 2 to 3 months up to a year or more in seed stored dry at room temperature. The geographic area where the seed is produced influences the length of time required to lose dormancy. Biotypes from the West lose dormancy in a month or so but seeds from Massachusetts biotypes required more than two years to become completely viable. Storage under moist and cool conditions comparable to winter soil conditions shorten the dormancy period to a few weeks for Massachusetts biotypes. But those from the

irrigated central valley of California do not have a chilling requirement, in fact, chilling is actually detrimental to the seeds viability.

A temperature of 50 F prevents germination of yellow foxtail and germination is very slow at 60 F. Ideal temperatures for germination are 70 to 85 F. As temperatures rise above 100 F, seed germination is poor and the seedling may die. There is a variation in the germination pattern in biotypes from different areas of the U. S. Those from the irrigated Southwest require warmer temperatures for germination and germinate more rapidly than those from the eastern and midwestern U. S.

Optimal burial depth for seeds of yellow foxtail is between 1/2 and 1-1/2 inches deep. Seeds even lightly covered with soil germinate better than those that are uncovered. While seeds buried 4 to 5 inches deep are capable of germinating, the percentage of success is considerably lower than from seeds buried less than 2 inches deep.

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