SOME FACTORS AFFECTING THE CONTROL OF YELLOW NUTSEDGE (*cyperus esculentus*)

by

ROBERT G. BRUCE

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Major Professor

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LITERATURE REVIEW

Yellow nutsedge (Cyperus esculentus) is one of the worst weed pests in agricultural crops. The United States Department of Agriculture considers it to be among the top five worst weeds (29). It is particularly a problem in agronomic crops such as cotton, soybeans and rice. Because of the economic importance of these crops, considerable research has been done to determine better methods of control. With the advent of minimum tillage practices, including decreased deep plowing and mechanical cultivation, nutsedge has become more prevalent.

Horticulturists do not always have the options of cultivation or crop rotation that are utilized for growing agronomic crops. This is particularly true of homeowners and turfgrass managers who, except during periods of establishment or renovation cannot take advantage of these methods (28). Consequently, other methods of control must be considered.

Several interrelated factors affect control of yellow nutsedge. Perhaps the most important of these are its high reproductive potential and the varying degrees of dormancy of tubers that are produced.

In many cases, better control could probably be achieved if more individuals were aware of the stages in the life cycle of the plant and in which of these stages it was most susceptible to control (14,15,16,21, 22,25,26,27,31).

Plant Description

The above ground portion of the plant consists of a triangular fascicle of yellowish green leaves developing from a basal corm. Leaf development is sequential from the outside toward the center of the corm. Growth terminates with the development of a seed bearing raceme, which extends through the center of the fascicle (31).

The below ground portion of the plant consists of the basal corm, from which extend fibrous roots and rhizomes. During the growing season, the rhizomes are capable of forming more rhizomes, basal bulbs, or tubers.

Yellow nutsedge is capable of producing new growth from seed, the basal bulb, nodes on the rhizomes and from tubers on the rhizomes (26,27). The primary reproduction method is considered to be from tubers (24,27). Tumbleson and Kommedahl (27) published data that illustrated the potential of yellow nutsedge to spread. In June 1959, they planted one tuber and by July 1960, the tuber had produced 1918 individual plants and 6864 tubers. They estimated total tuber production under optimum conditions in peat to be eight tons per acre.

Tuber production occurs throughout the top 50 centimeters of the soil surface (21,24) with the majority produced in the surface 15 to 20 centimeters. Tuberization occurs primarily from early July until mid October and is dependent on photoperiod (15). Optimum photoperiod for tuber formation is 8 to 12 hours (14) with the greatest number being formed during the shorter photoperiod of September and October.

Each tuber is capable of germinating more than once (21) and while germination is not dependent on size, there is an indication that it

influences subsequent plant vigor. Tuber germination is often delayed for long periods of time. Stoller and Wax (22) found, under optimum conditions, tubers could remain dormant for up to 22 months. The author has successfully germinated tubers that have been stored for 27 months. Since all tubers are not in the same dormancy stage at a given point in time, germination can occur over an extended period of time with shoots appearing from mid to late April until August (22).

The second most important method of reproduction is by seed. Large quantities of viable seed are produced (9,14,26). Hill et al (9) calculated potential seed production at approximately 45,000 grams per acre, capable of producing between 11 and 125 million plants per acre. Jansen (14) reported that seed formation required a photoperiod of 12 to 14 hours and that 50% to 90% of the seed produced could germinate.

Control Methods

Mechanical cultivation

In the past, the recommended method of control for agronomic and horticultural crops has been deep and frequent hoeing and, in extreme cases, the use of hogs to grub out the plants (8). Mechanical cultivation is indeed a good method of control in agronomic and horticultural crops that can be cultivated. Mechanical cultivation stimulates the breaking of tuber dormancy, which once they have sprouted are more susceptible to chemical control (25). Stoller and Wax (22) observed that tubers exposed to winter temperatures below -7 C exhibited only 50% survival if they were located in the top 5 centimeters of soil.