

APPLICATION OF MULCH (WOOD CHIPS) CONTROL NUTSEdge AT A GHOROGH NURSERY (CASE STUDY: GHOROGH NURSERY, GOLESTAN PROVINCE, NORTH OF IRAN)

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ABSTRACT

Weed control in the nursery is important for healthy performance of seedlings. In many nurseries nutsedges has significant problem due to their tolerance of many herbicides and their prolific production of energy-rich tubers. Sharing knowledge concerning nutsedge management may allow us to efficiently find viable solution to this problem. The purpose of this study was to examine the effectiveness of broadcast application of mulch for control of Nutsedge in Ghorogh nursery. Application in June 2011 of Mulch at 3 centimeter reduced the density nutsedge shoots at a Ghorogh nursery. Nutsedge shoots were reduced to near zero levels in plot treated over a 7 months period. The use of broadcast application of mulch may be of value in developing a more effective management program for nutsedge control in Ghorogh nursery.

KEYWORDS: Mulch, Nutsedge, *Quercus Castaneifolia*, Ghorogh Nurcery, Weed Control, Golestan Province, Iran

INTRODUCTION

Nutsedge are perennial weeds that are prolific produces of tubers. Nutsedges have since become important weeds throughout the world. Based on the worldwide distribution (considered weeds in at least 92 countries) and importance in many diverse crops (infesting at least 52 different crops),nutsedge was ranked as the world 's worst weed [2]. Successful nutsedge management requires the knowledge of management strategies. One of the keys to managing nutsedge species is to target mulch application. Proper timing of mulch applications will improve the efficiency of these applications. As proof, consider the uneasy relationship between seedling and turf grass, research by Gary Watson and colleagues at the Morton Arboretum showed that turf grass have a competitive advantage over seedling roots because of their greater density and close proximity to the soil surface. Competition with turf grass for soil moisture becomes especially problematic for seedlings during periods of drought. Conversely, mulches are commonly used to suppress weeds [1]. Organic mulching is an excellent method of weed control. 3 to 4 centimeters of mulch material (wood chips) provides weed control for three to five years. If mulches can be application to large scale planting, mulching provides excellent weed control and other benefits [3, 4]. The Cornell study also found that 3 centimeter of mulch suppressed almost all weed growth on transplanted White pine and pin oak saplings than either an un-mulched treatment or mulch applied to depths of 6 to 10 centimeter [1]. Herms in 2001 showed that a thin layer of mulch does not suppress weed. On the other hand, an excessively deep mulch layer can promote water logging of heavy soils, decrease soil oxygen levels, and result in shallow rooting. A 3 to 4 centimeter layer of mulch applied to well-drained soils in seasonally dry climates can help minimize drought stress. However, a 2 to 3 centimeter layer is more appropriate on heavy soils in regions where rain fall is more frequent. In this paper, we present information that provides an initial framework for an integrated weed management program. This study

includes an evaluation of the effectiveness of mulch (wood chips) for the control of nutsedge.

MATERIALS AND METHODS

Study Area

The field trials took place in 2011 on Ghorogh nursery in the east of Golestan Province of Iran. Ghorogh nursery is located on the Gorgan-Gonbad highway, 22 kilometers east of Gorgan. It was established in 1353 on a foundation of high quality seedlings and great customer service. The elevation is 120 meters above sea level. It has an area of 76 hectares of which 60 hectares is use. Ghorogh nursery grows 31 varieties of plant seedlings and has the proven capacity to produce well over 7,500,000 seedlings per year. The soil texture was a loam. Weeds were controlled chemically using glyphosate (Roundup) prior to planting and by hand during the trial.

Plant Material and Experimental Design

Three-months-old, Bare root *Quercus castaneifolia*, an important species for planting in the North of Iran, were analyzed in this paper. The trials were laid out in a randomized complete block design. The block was planned in a square formation to minimize effects of any gradients in soil conditions. Three blocks were used and plots were approximately 3 m long and 1 m wide. Three of the plots were lay out with mulch, the other three plots were not. Seed of *Quercus castaneifolia* were planted by hand at the Ghorogh nursery at 2 cm square spacing on 20 February 2011. Mulch was made when seedlings were three-months-old during June. In this investigation occurred on 21 June 2011, 3 centimeter mulch at three replication were applied. Pre emergent herbicides were applied as part of the standard weed control programs at the nursery. Plots were hand-weeded as necessary during the summer of 2011, and data was collected to include number of weeds. Randomly selected square meter block from each plot were taken for weed counts in the Ghorogh nursery trial.

RESULTS AND DISCUSSIONS

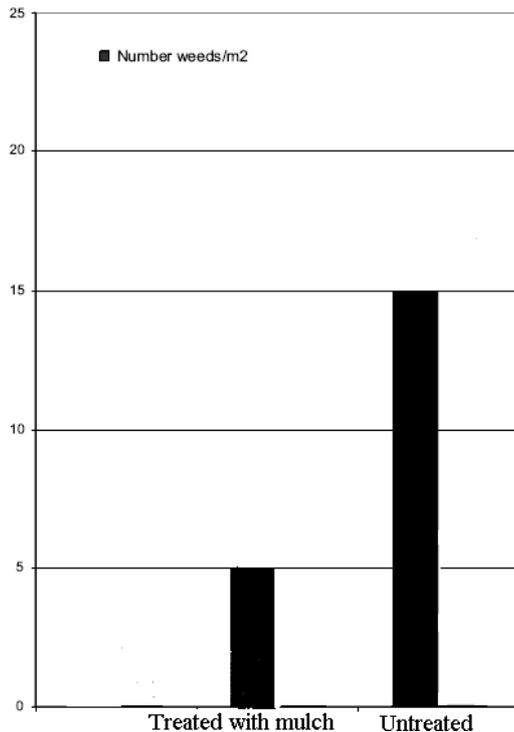
Incorporation of mulch into the upper 3-cm of soil in summer suppressed weed growth through the following spring. The trial in Ghorogh nursery was a large plot three replicated trial planted with *Quercus castaneifolia*. Mulch (wood chips) was an effective weed control. Treatment was much more effective than the untreated control (Figure 1). The 3-cm-deep wood chips mulch treatment was effective in suppressing nutsedge. The results from the study showed that good weed control was possible with wood chips mulch. In our test at the Ghorogh nursery, mulch proved very effective for nutsedge control in a field. The use of mulch in nutsedge-infested areas that border production fields may also help to reduce the rate of reintroduction of this weed into seedbeds. This study demonstrates that mulches controlled weeds and were not detrimental to *Quercus castaneifolia* seedling. Takeda 2005 showed that mulch was more effective than bio-weed in controlling weeds and provide a level of suppression achieved during the establishment year.

Their work demonstrates that mulch can be applied to suppress weed. Our finding clearly showed the importance of weed control with mulch (wood chips) and are in agreement with the results of studies investigating the effects of mulch on weed control [1, 3, 4]. Takeda 2005 showed that satisfactory results from the application of mulches are possible (e.g., excellent weed control during establishment year) when the 4-cm mulch is applied after the transplants are established, that is in agreement with our studies. In nursery, the most common method of weeding is the hand weeding because of closeness of seedling and their delicate nature and physical weeding often damages the young roots and shoots. Therefore, it becomes necessary to make use of mulch for the control of weeds in the nursery. Nutsedge control is a multi-season effort. Mulch will often be the basis of nutsedge management programs. While control of foliage is important, successful

long-term control will require management options that reduce or eliminate tuber production and viability. Field trial in this investigation shows that mulch is highly acceptable to the nursery growers and is applicator and environmentally friendly. Mulch is easily applied by nursery staff and to further assure effective weed control, soil surface should be maintained at optimum levels (at least 3 centimeter) in contrast sun. The goal of this research was to test the potential usefulness of new weed control techniques in *Quercus castaneifolia*. More studies are needed to determine what correction will be required to use of mulch in *Quercus castaneifolia* seedlings. Because, many factors should be considered when deciding how deep the mulch layer should be, general recommendations are not possible. For example, the optimal depth of mulch will vary depending on soil texture, climate, type of mulch, age of plants and management objectives.

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- Three replicated field trial
- Plots were approximately 3 m long and 1 m wide
- Loam soil
- Three centimeter mulch (wood chips) were applied on June 2011
- Plots weeded during the summer of 2011
- Major weed include nutsedge
- Weed were controlled chemically using glyphosate prior to planting and by hand during the trial

Figure1: Weed Control with Mulch in the Ghorogh Nursery, 2011 (3 Centimeter)

