EFFECT OF DIFFERENT LEVELS OF SHADING AND FERTILIZING ON THE GROWTH AND PRODUCTION OF ASPARAGUS AND RUSCUS ORNAMENTAL PLANTS

By

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ABSTRACT

Raghdaa Abd El-Salam El-Gendy: Effect of Different Levels of Shading and Fertilizing on the Growth and Production of *Asparagus* and *Ruscus* Ornamental Plants. Unpublished Ph.D. Thesis, Department of Horticulture, Faculty of Agriculture, Ain Shams University, 2015

In a pot experiment, plants of *Asparagus densiflorus var.* "Meyers" and *Ruscus hypoglossum* were grown under two levels of saran shade (33 and 63%). The plants were fertilized with three levels of NPK fertilization; (16:5:10), (32:10:20) and (48:15:30) kg/ 30 cm pot/ season. A vase life experiment was done to study the effects of different levels of shade and fertilizing on life and quality of *Asparagus* and *Ruscus* branches.

For *Asparagus* plants, high level of shade (63%) and fertilization with NPK (48:15:30) kg/pot/season produced the highest shoot length, total chlorophyll, and chemical contents (N, P and K %). Meanwhile, 33% shade gave the highest number of shoots and the longest vase life. However, fertilization levels had no significant effect on vase life.

In *Ruscus* plants, 63% shade gave the highest shoot length, shoot fresh weight, potassium and magnesium content, nitrogen content (for the first season) and highest vase life (on October 2011 and April 2012). The increase in fertilization levels caused increasing in shoot length, shoot number, fresh and dry weight of shoots, chlorophyll content, nitrogen, calcium and magnesium content.

Key words: *Asparagus densiflorus*, *Ruscus hypoglossum*, Shading, Fertilization, NPK, Vase life

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1. INTRODUCTION

Asparagus densiflorus “Meyers” is a herbaceous perennial plant native to Southern Africa from Mozambique to South Africa. Formerly, it was classified in the family Liliaceae while, now it is placed in the family Asparagaceae. **(Angiosperm Phylogeny Group II, 2003).** The genus name of *Asparagus* is thought to be derived from the Greek *Asparagos* for the cultivated asparagus and is possibly derived from 'a-'- intensive and *sparassa* - to tear, referring to the sharp spines of many species. The species name of *densiflorus* refers to the way the small flowers are densely packed along the stem of the plant. It is a very different-looking plant, and has a more formal appearance. The tiny foliage is arranged densely along individual semi-erect stems that look remarkably like green fox tails.

Asparagus species have a botanically very interesting structure. The so-called leaves are not true leaves at all, but are actually cladodes and are thought to be modified branches, while the spines are formed from modified branches or from modified leaves.

Flowers are small, most often white or pale pink and are very sweetly scented. They are not very noticeable, as they are half hidden by the foliage and do not last long. The small flowers are followed by showy bright red berries, which each have one large black seed in them. The berries are attractive to birds and may be spread by them.

The plants have extensive root systems with fairly large tubers, which are used in nature to provide food during long periods of drought in summer. They can be readily propagated by separating the tubers in fairly large clumps, or by sowing the seed in spring or early summer.

The Asparagus plants use as a houseplant for bright, sun-filtered areas. Also, it is good for hanging baskets. The green stems are valued by florists for adding to flower arrangements.

Cut foliage of *Asparagus densiflorus* “Meyers” had a vase life higher than nine species and cultivars of *Asparagus*; *A. africanus, A.*

crispus, A. densiflorus "Sprengeri", *A. falcatus, A. officinalis* subsp. *Prostrate, A. pseudoscaber, A. retrofractus, A. setaceus, A. virgatus* **(Stamps *et al.* 2005).**

Ruscus is a genus of flowering plants in the family Asparagaceae, formerly classified in the family Liliaceae. *Ruscus hypoglossum* plant is native to the Mediterranean area from Italy in the west to Northern Turkey in the east. True leaves of this species are highly reduced to a tiny scale-like structure. The flat green leaf-like structure, on the other hand, is actually flattened stem, namely "cladodes". The true leaves are minute, scale-like and non-photosynthetic. The flowers are small, white with a dark violet centre, and situated on the middle of the cladodes. In summer, flowering is followed by red berry fruits 5-10 mm diameter.

It is propagated by seeds and by division of the underground rhizomes.

Ruscus hypoglossum plants need partial shade to full shade. Even though they tolerate full sun, the color is richer in shade. They are very drought tolerant, but should be watered twice a week for optimum growth.

Stems used in floral arrangements as a filler element. In addition, it can be used as a ground cover in the landscape, especially in shaded locations.

The majority of foliage plants are grown under shade and semi-shade conditions. So, it used to be grown under shaded greenhouse. A shade net blocks out a certain percentage of light and it differs in materials, colour and density. Cheaper shade cloth is woven from saran (polyvinylchloride) which is available in various densities ranging from 30% to 95% shade. It is usually black, but also comes in green, blue, red or grey these colors had different effects on quality and productivity as mentioned by **Shamir *et al.* (2001)** on *Pittosporum variegatum*. Black saran was used in this study with two level of shade 33% and 63%.

INTRODUCTION

Foliage plants need nitrogen in higher concentrations than any other fertilization elements. Plants were fed with a nutritive solution prepared according to foliage plants needs **(Pergola *et al.* 1994).**

Vase life of cut foliage plants depends on the cultivar, cultivation conditions, harvest, as well as the conditions during storage and transport. In this investigation we focused on the cultivation conditions under saran house.

Several commercial floral preservatives are added to the holding solution to elongate the life of cut shoots or flowers after harvest, one of these preservation solutions is a gibberellic acid (GA_3). Gibberellic acid has a positive effect on preventing leaf yellowing and increasing soluble sugar and retarding degradation. **Skutnik *et al.* (2006)** and **Swider and Skutnik (2009)** found that the gibberellic acid (GA_3) prolonged the vase life for *Asparagus densiflorus* "Meyers" plants**.**

Other preservation solution is 8-hydroxyquinoline sulphate (8-HQS). The 8-HQS prevent the growth of microorganisms in xylem vessels of cut flower stems and maintained the water uptake. However, combined 8-HQS with sucrose enhance the postharvest quality and prolong the vase life of cut snapdragon flowers **(Asrar, 2012)**. Also, **Elhindi (2012)** found that combined 8-HQS with 2% sucrose showed the best vase-life for Cut spikes of sweet pea.

The aim of this research is studying the effect of different levels of shading and fertilization on the growth of *Asparagus* and *Ruscus* plants and on the quality of their shoots after harvest.