Specialty Cut Flowers

Subjects: Horticulture
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The objective of the study was to give an overview of the specialty cut flowers, their advantages and disadvantages and comparisons to the traditionally grown plants.

Keywords: sustainability ; floriculture ; environmental impact

1. Introduction

Global cut flower production and consumption has overcome serious challenges in the past 20 years, especially those related to global economic recessions. The EU holds the first place in cut flower and ornamental potted plants sales with 31.0% of the global value, with China and the USA in second and third place, holding 18.6% and 12.5%, respectively [1]. Within the EU, in 2016, the Netherlands had the most sales of cut flowers and ornamental plants, with France and Italy in second and third places, respectively [1]. Cut flower and ornamental plant sales in the EU increased by 7% (approx. 1.4 billion euro) from 2006 to 2016, indicating a slow, but steady increase, despite the elaborate global economic status [1]. On the contrary, the number of cut flower producers in the USA declined significantly from 2007 to 2015 [2], with many of them forced out from the floriculture industry during the 2008–2009 recessionary shakeout period [3]. Cut flower production in the USA showed a modest increase from 2015 to 2018 [4][5]. The reductions recorded by the USDA between 2007 and 2015 reached 30%, indicating that cut flower production has shifted to new worldwide players such as China, Colombia, and Ecuador [6]. In 2017, China came first in sales of cut flowers and first in cut flower exports to the EU.

2. Sustainable Production of SCF vs. TCF

As the green industry continues to mature, differentiation is an increasingly important business strategy [7]. One way to accomplish this is by adopting environmentally friendly behaviours that will attract consumers with environmental awareness [8][9][10]. These potential consumers are more likely to purchase environmental friendly products with reduced CO_2 footprints [3][7]. There is a small, but considerable, percentage of people who were willing to pay more money for agricultural products associated with sustainable, eco-friendly cultivation procedures [11][12]. Mainstream consumers were willing to buy eco-friendly products, but only at a modest price difference. Special attention should be given to consumer education and other promotion-related programs based on partnership between universities and private bodies (i.e., Texas Superstar®) to increase sales of new cut ornamental products [13]. Growers were also willing to adopt eco-friendly practices in cultivation, although they were sceptical on the implementation within their current cultivation system [14]. Back in 2010, Dennis et al. [14] reported that none of the grower respondents in their survey were certified as sustainable.

The recognition of floricultural products as “sustainable” is complex and demanding. Sustainable production is achieved via the implementation of strict environmental and social protocols as defined by the national and international directives [15][16]. Restrictions on CO_2 footprints and global warming potential (GWP) may affect production of cut flowers in the future [16][17]. Over a public demand for cleaner agricultural products, the sustainable SCF cultivation may serve as the environmental friendly alternative option. This can be a major strength of SCF compared to TCF (Table 2). Wandl and Haberl [18] showed that summer and spring SCF grown outdoors had <0.1 kg $CO_{2\ eq}$, while rose cultivation produced up to 13-fold more kg CO_2. The main differences in CO_2 production between the SCF and TCF were associated with excessive heating and electricity use “off-season” (i.e., the cold days of the year). Life cycle assessments (LCA) showed that increased CO_2 outputs for the production of roses, chrysanthemums, and gerberas were profound in Central and Northern European countries such as the Netherlands, Germany, and Austria [18][19][20][21]. Significant differences in CO_2 footprints, acidification, global warming, human toxicity, marine ecotoxicity, terrestrial ecotoxicity, and phytochemical oxidation were reported for roses produced in Dutch greenhouses compared to those produced in Ecuadorian facilities [16][21]. While CO_2 for roses produced in Kenya and Ethiopia ranged between 0.4 and 3.7 kg $CO_{2\ eq}$, the Dutch roses released 16–29 kg $CO_{2\ eq}$ [20]. In Greece, the cultivation of carnations in non-heated greenhouses produced only 0.316 kg $CO_{2\ eq}$ [22], indicating that heating during winter is the single most important factor contributing to greenhouse gas (GHG) emissions. As a result, future environmental legislations will apply limitations to TCF cultivation at traditional production centres, or may help in shifting production of TCF to countries in the African continent or at South America [16][17][23][24][25].

Fertilization and agrochemical use both contribute to the environmental outputs during cultivation. Growers of TCF support the integrated nutrition management (INM) and integrated pest and disease management (IPDM) programs to reduce their environmental footprints [16]. However, pesticide residue levels in roses, gerberas, and chrysanthemums highly concerned authorities and consumers in the EU in the past decade. In a study conducted in Belgium, 107 active ingredients were detected in harvested rose, gerbera, and chrysanthemum bunches [26]. Among them, roses were the most contaminated flowers with 14 distinct substances detected per sample and a total concentration of 26 mg kg^{-1} for a single rose sample. Substances such as acephate, methiocarb, monocrotophos, methomyl, deltamethrin, etc., could generate direct toxic effects to the nervous system of florists and consumers [26]. No research was found on pesticide residues detected on SCF. Generally, SCF suffer fewer fungal and pest contaminations during production, and therefore require minimal amounts of phytochemicals. SCF crop rotation and seasonal production might be the key to less infections and herbivore attacks. In every case, the implementation of IPDM to ornamental crop production may eventually reduce pesticide residues and improve the profile of the floricultural products.

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