

Susceptibility of *Vicia sativa* Cultivars to an Oncogenic Strain of *Agrobacterium tumefaciens*

Aziz KARAKAYA¹

Cafer Sırrı SEVİMAY²

Geliş Tarihi: 28.04.2003

Abstract: *Agrobacterium tumefaciens* is commonly used in gene transfer to plants. Determination of the suitable plant genotypes facilitate this process. In this study, eight common vetch cultivars grown in Turkey were assessed for their susceptibility to oncogenic *Agrobacterium tumefaciens* strain A281. All common vetch cultivars showed susceptibility to infection from *A. tumefaciens* strain A281.

Key Words: *Agrobacterium tumefaciens*, *Vicia sativa*, common vetch, tumor formation

Vicia sativa Çeşitlerinin Ur Oluşturan Bir *Agrobacterium tumefaciens* Streynine Hassasiyetlerinin Belirlenmesi

Özet: *Agrobacterium tumefaciens* bitkilere gen aktarımında yaygın olarak kullanılmaktadır. Uygun bitki genotiplerinin belirlenmesi bu işlemi kolaylaştırmaktadır. Bu çalışmada, Türkiye'de yetiştirilen sekiz fiğ çeşidinin doğal tip *Agrobacterium tumefaciens* streyni A281'e karşı hassasiyeti belirlenmiştir. Fiğ çeşitlerinin hepsi *A. tumefaciens* enfeksiyonlarına hassasiyet göstermişlerdir.

Anahtar Kelimeler: *Agrobacterium tumefaciens*, *Vicia sativa*, fiğ, ur oluşumu

Introduction

Common vetch (*Vicia sativa* L.) is an important forage crop in Turkey where it is grown in almost every part of the country. In 1998, the planting area of the common vetch was 325.000 ha (Anonymous, 1998). It is grown both as a hay and seed crop. It could be utilized for all livestock, however, it is especially suitable for the milkcows. It increases organic matter content of the soil. It has also the ability to fix the atmospheric nitrogen. Common vetch can also be grown in the fallow years by itself or by a mixture of barley and/or oat (Kurt and Tan, 1984). In areas where the annual rainfall exceeds 400 mm there is a great potential of production of quality forages using common vetch. This is very important in Turkey where there is great need for quality forages (Açıkgöz, 2001). For this reason, the improvement of the common vetch will be very helpful for livestock production. One of these improvement techniques is the usage of *Agrobacterium tumefaciens* (Smith and Townsend) Conn. Although several direct gene transfer techniques have been developed, *Agrobacterium tumefaciens* is still preferred for the transfer of foreign genes into many plant species. *Agrobacterium tumefaciens* is a gram negative soil bacterium that causes crown gall disease in numerous crops (Agrios 1997). Tumor formation is mediated by the Ti plasmid which is found in the bacterial cell (Zaenen et al. 1974, Watson et al. 1975). Two plasmid and one chromosomal components are required for plant cell transformation (Citovsky et al. 1992). T-DNA portion of this plasmid integrates the nuclear DNA of plant cells (Chilton et al. 1980). T-DNA genes are not essential for gene transfer and DNA inserted between border sequences may be transferred to plant genome (Leemans et al. 1982,

Schell and Van Montagu 1983). Artificial plasmid vectors have been developed. These engineered vectors are now used routinely to introduce antisense, modifying, insect, disease- and herbicide resistance genes into many crop species (Hooymaas and Schilperoort 1992). Perhaps the greatest weakness of this system is the host range limitation. Also cultivar and genotype response to *A. tumefaciens* may vary (Karakaya and Özcan 2001). Before transformation work via *A. tumefaciens* can begin, successful elucidation of suitable genotypes is necessary. Therefore, In this study, eight different common vetch cultivars grown in Turkey were assessed in order to determine their susceptibility to oncogenic *Agrobacterium tumefaciens* strain A281 with the ultimate aim of introducing foreign genes into the common vetch genome using non-oncogenic *A. tumefaciens* strains.

Materials and Methods

Seeds of the common vetch cultivars Ürem, Nilüfer, Emir, Çubuk, Karaelçi, Kubilay, Uludağ, and Sarıelçi were obtained from the Field Crops Department, Faculty of Agriculture, Ankara University. Eight seeds of each cultivar were sown in pots. After germination, they were thinned out to four plants/pot. Plants were maintained in a controlled growth room with a 22 ±1°C and 18±1°C day/night temperature regime. Inoculation of plants with *A. tumefaciens* was carried out as described earlier (Özcan 1995). Five weeks after planting, the common vetch cultivars were inoculated with *Agrobacterium tumefaciens* strain A281 (pTiBo542: pBI121.1) which was obtained

¹ Ankara University, Faculty of Agriculture, Department of Plant Protection, Ankara-Turkey

² Ankara University, Faculty of Agriculture, Department of Field Crops, Ankara-Turkey