Flower Development of Ornamental Crabapple According to BBCH Scale

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ABSTRACT

Crabapples offer a wide variety of tree forms and size, leaf shapes, flowers and colourful fruits which improve the quality of green spaces, being an excellent four-season landscape trees. The aim of this study was to determine flower development of *Malus x zumi* 'Professor Sprenger' using Biologische Bundesantalt, Bundessortenamt, and Chemische Industrie - BBCH code under urban conditions. Observations were made weekly during two growing seasons to identify the flowering stages. Flower development of ornamental crabapple described according to BBCH scale started from flower induction until dormancy. Knowing the flower development stages of 'Professor Sprenger' variety provide information on visual assessment protocols from urban areas and determine the species' most ornamental period of the year.

Keywords: BBCH code, flower stages, *Malus x zumi* 'Professor Sprenger'

Introduction

Crabapples (*Malus* sp.) are well known for their ornamental values which make them to be constantly used in urban design. They have specific effects and impacts for landscape settings (Draper, 2006). Crabapples have a variety of tree forms and size, leaves shapes, flowers and colourful fruits which contributes to the visual quality of urban green spaces. From spring bloom to attractive colours of the leaves in autumn and colourful fruits till winter, crabapples are excellent for long season interest (Shawn, 2006).

Materials and Methods

The aim of the current work was to determine the phenological growth stages of *Malus x zumi* 'Professor Sprenger' using Biologische Bundesantalt, Bundessortenamt, and Chemische Industrie - BBCH code and to describe the development process of the species under urban conditions. Data were collected from the experimental orchard of the University of

Agricultural Sciences and Veterinary Medicine from Cluj-Napoca (Romania). *Malus x zumi* 'Professor Sprenger' fruit trees were selected in order to perform this study. Visual observations and photographs were carried out weekly during two growing seasons (2016-2017) in order to characterise flower development and to determine the period of the year in which 'Prof Sprenger' is the most decorative. Photographs of the flower stage development were taken using a professional camera.

Results and Discussions

Flower development in ornamental crabapple described according to BBCH scale started from flower induction till dormancy. First stage was bud dormancy (stage 00) and last stage was total leaf drop (stage 97). At the beginning of April, first sepals appear and open and separate in an angle of 120°. Full bloom of 'Professor Sprenger' cultivar appear in the middle of the April, after 4-6 weeks from bud burst, and lasted for two weeks. In this

Tab. 1. Flower development stages of *Malus x zumi* 'Professor Sprenger' according to the BBCH code

BBCH Code 03	BBCH Code 10	BBCH Code 19	BBCH Code 59	BBCH Code 63
End of leaf bud swelling: bud scales light coloured with some parts densely covered by hairs	Mouse-ear stage: Green leaf tips 10 mm above the bud scales; first leaves separating	First leaves fully expanded	Most flowers with petals forming a hollow ball	About 30% of flowers open

BBCH Code 67	BBCH Code 69	BBCH Code 71	BBCH Code 74	BBCH Code 85
Flowers fading: majority of petals fallen	End of flowering: all petals fallen	Fruit size up to 10 mm; fruit fall after flowering	Fruit diameter up to 40 mm; fruit erect	Advanced ripening: increase in intensity of cultivar-specific colour

period of the year crabapple 'Professor Sprenger' is very decorative. The differences between these two growing seasons was insignificant. The blooming time of this species is the most attractive for the users of public green spaces because of the abundance of white flowers. Association of this species with another ornamental plant for creating a wonderful visual perception of the greenery, can be done according to the blooming period of those species.

In table 1 there are presented in detail *Malus x zumi* 'Professor Sprenger' flower development, starting from leaf bud and ending with fruit development. Each photograph corresponds to a code which describe the flower stage according to the BBCH scale.

Conclusion

Phenological growth stages in general are effective tools for large cities. It leads to under-

standing the pollination, ecosystem functions and flowering process of the tree species. Flower development of *Malus x zumi* 'Professor Sprenger' according to BBCH scale have not been reported before. Knowing the development stages of 'Professor Sprenger' variety offer information on visual assessment protocols from urban areas and helps to understand the tree development process under urban conditions. Also, helps to highlight the beauty of this species by choosing the right plants to associate with in green spaces landscape design.

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