VIVIPARY IN *FAGOPYRUM ESCULENTUM*

ŽIVORODNOST PRI AJDI (*FAGOPYRUM ESCULENTUM*)

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ABSTRACT

Vivipary in *Fagopyrum* esculentum

Common buckwheat *(Fagopyrum esculentum* Moench) is an economically important crop, exhibiting a unique phenomenon of vivipary, which is usually a trait shown by plants growing in wet, arid and flodded conditions. Vivipary was observed in both ripe and un-ripe (green) seeds on the inflorescence. The expression of this trait in buckwheat is detrimental for the crop yield.

Key words: *Fagopyrum*, buckwheat, vivipary, germination

IZVLEČEK

Živorodnost pri ajdi (*Fagopyrum esculentum*)

Navadna ajda (*Fagopyrum esculentum* Moench) je gospodarsko pomembna poljščina, pri kateri je opazen edinstven pojav živorodnosti (viviparija), ki je običajno lastnost rastlin, ki rastejo na mokrih, suhih in poplavnih območjih. Živorodnost so opazili pri zrelih in nezrelih (zelenih) semenih na socvetju. Izražanje te lastnosti pri ajdi zmanjša uporabno vrednost pridelka.

Ključne besede: *Fagopyrum*, ajda, živorodnost, kalitev

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1 INTRODUCTION

Buckwheats (*Fagopyrum* spp.) a dicot pseudocereal is a crop of short duration, grown in many places around the world. It's economic and health promoting effects are due to its bioactive constituents. It has abundant rutin (flavonoid) content and has a potential for becoming main industrial source of rutin. These properties have put it among the functional foods and therapeutic medicines.

2 RESULTS AND DISCUSSION

Here we report that *Fagopyrum esculentum* Moench exhibited seed germination within the inflorescence, a well known phenomenon, known as vivipary. Predominantly vivipary is the trait of mangroves but there are reports of vivipary in some members of the family *Polygonaceae*, however buckwheat belonging to the same family usually does not show such characteristic. There has been an earlier report by Katoch et al. (1979), however, the illustrations are vague. Vivipary has been documented in alpine, arctic (Lee & Harmer 1980, Elmqvist & Cox 1996) and tropical (Farnsworth & Farrant 2004) plants in arid and wet or flooded environments. Usually the phenomenon of vivipary is exhibited by ripe seeds but in our present investigation, some unripe seeds, green in colour, also shows this unique feature (Figure 1 C). However, no such phenomenon could be observed in other species of buckwheat. Vivipary is also significant from an agricultural perspective because it would cause loss in yield. The lack of seed dormancy is highly undesirable because the premature sprouting of grains creates a major challenge in maintaining food supplies (Tsiantis 2006). There are few studies that have evaluated germination and vivipary in buckwheat. Cormack (1952) found that the removal of the pericarp and seed coat resulted in the germination of dormant seeds of Tartary buckwheat. Vanden Born & Corns (1958) reported that gibberellic acid (GA) improved partially the germination of after ripening seeds, but not of fully dormant seeds. It has been reported that in buckwheat the *VP (viviparous) 1/ABI (Abscisic Acid-Insensitive)* 3 gene is responsible for controlling seed development and germination (McCarty 1995, Jones 1997, Nakamura & Toyama 2001) and the induced mutation in this gene have been shown to cause vivipary (Nakamura & Toyama 2001).

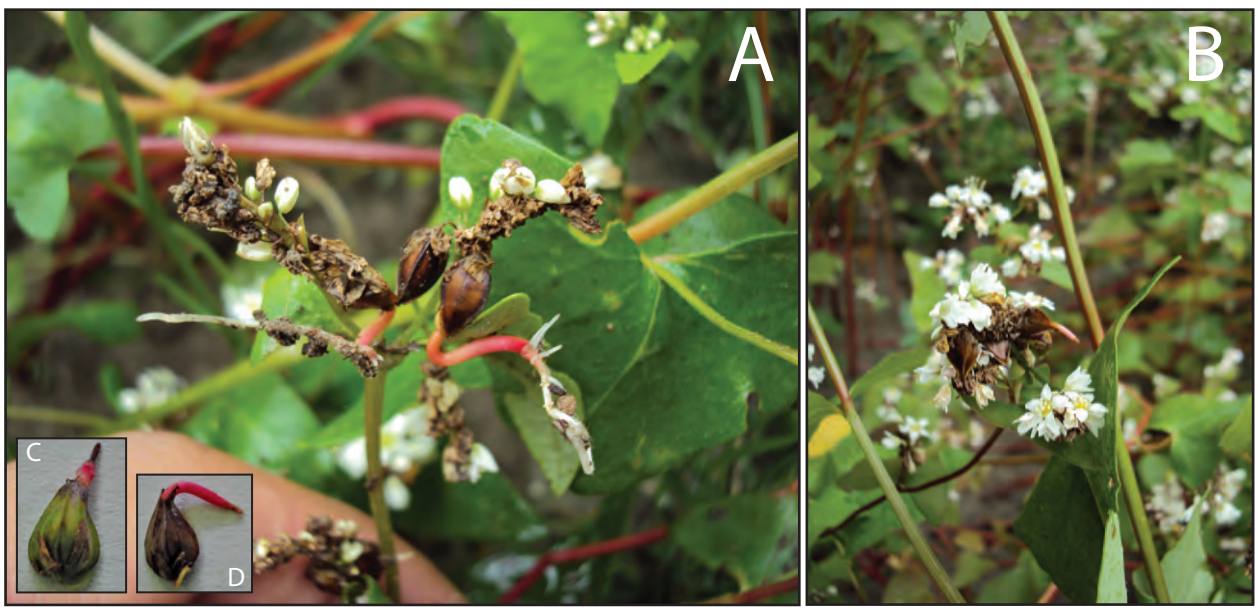

Figure 1: Panels A, B: F. esculentum Moench. showing vivipary, Panel C: green viviparous seed, Panel D: mature viviparous seed.
Slika 1: Podokni A, B: prikaz živorodnosti pri navadni ajdi (F. esculentum Moench), Podokno C: zeleno živorodno seme, Podokno D: zrelo živorodno seme.

3 POVZETEK

Ajda (*Fagopyrum* spp.) je dvokaličnica, ki se uvršča med neprava (psevdo) žita. Je poljščina, ki jo pridelujejo v številnih krajih po svetu.

V tem članku bomo predstavili dobro znan pojav živorodnosti (viviparije) pri opazovani kalitvi semen navadne ajde (*Fagopyrum esculentum* Moench) na socvetju. Živorodnost je pretežno lastnost mangrove, obstajajo pa tudi poročila o živorodnosti nekaterih vrst družine Polygonaceae, vendar ajda, ki tudi pripada k tej družini, običajno ne kaže te lastnosti. O tem so v preteklosti že poročali Katoch et al. (1979), vendar slike niso bile primerno razločne. Živorodnost so dokumentirali pri alpskih, arktičnih (Lee & Harmer 1980, Elmqvist & Cox 1996) in tropskih (Farnsworth & Farrant, 2004) rastlinah v sušnih in mokrih ali poplavljenih okoljih. Običajno je pojav živorodnosti ugotovljen pri zrelih semenih, vendar v naši sedanji raziskavi tudi nekatera nezrela semena, zelene barve, kažejo ta edinstven pojav (slika 1 C). Vendar o tem pojavu še niso poročali pri drugih vrstah ajde. Živorodnost je s kmetijskega vidika neželjena zaradi izgube kakovosti pridelka. Pomanjkanje mirovanja semen (dormanca) je zelo nezaželeno, ker se zaradi prezgodnje kalitve zrn nastaja problem skladiščenja in ohranjanja zalog hrane (Tsiantis 2006). Obstaja nekaj študij, ki so ugotavljale kalitev in živorodnost pri ajdi. Cormack (1952) je odkril, da je odstranitev perikarpa in luščin povzročila kalitev mirujočih semen tatarske ajde. Vanden Born & Corns (1958) sta poročala, da je giberelinska kislina (GA) delno izboljšala kalitev po zorenju semena, razen pri popolnoma mirujočih semenih. Ugotovljeno je bilo, da je pri ajdi gen VP (živorodna) 1 / ABI (Abscisic Acid-Insensitive) 3 odgovoren za razvoj semen ter kalitev (McCarty 1995, Jones 1997, Nakamura & Toyama 2001) in da inducirane mutacije v tem genu povzročajo živorodnost (Nakamura & Toyama 2001).

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