



University of Kentucky
UKnowledge

International Grassland Congress Proceedings

XXI International Grassland Congress / VIII
International Rangeland Congress

Studies on *Attachment Behavior* of Germinating Surface-Sown Mengnong Sainfoin and *Astragalus adsurgens* Seeds

Yanjie Mi

Inner Mongolia Agricultural University, China

Fengling Shi

Inner Mongolia Agricultural University, China

Cuiping Gao

Inner Mongolia Agricultural University, China

Ning Lu

Follow this and additional works at: <https://uknowledge.uky.edu/igc>



Part of the [Plant Sciences Commons](#), and the [Soil Science Commons](#)

This document is available at <https://uknowledge.uky.edu/igc/21/14-2/2>

The XXI International Grassland Congress / VIII International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

This Event is brought to you for free and open access by the Plant and Soil Sciences at UKnowledge. It has been accepted for inclusion in International Grassland Congress Proceedings by an authorized administrator of UKnowledge. For more information, please contact UKnowledge@lsv.uky.edu.

Studies on attachment behavior of germinating surface-sown Mengnong Sainfoin and Astragalus adsurgens seeds

Mi Yanjie¹, Shi Fengling¹, Gao Cuiping¹, Lv Ning

¹College of Ecol. and Env. Sci., Inner Mongolia Agric. Univ., Hohhot, Inner Mongolia 010018 P.R of China; E-mail: sfl0000@126.com

Key words: germination behavior, surface-sown, attachment type

Introduction Aerial seeding is widely used in grassland establishment and regeneration as one of the key approaches of seeding on the soil surface (W Liu 2003). Low germination percentage, unstable attachment, and low seedling emergence often occur with aerial seeding. Lack of seedling establishment is often influenced by seed germination characteristics and the environment (Osamu Morita 1995). Behavior of the seed's radicle can also be important in seedling establishment from surface sown seeds. Thus we are investigating the radicle attachment characteristics of two forbs.

Materials and methods The seeds of *Astragalus adsurgens* Pall. and Mengnong Sainfoin (*Onobrychis viciaefolia* Scop. cv. Mengnong) used in this study were harvested in 2006. Seeds were sown on the surface of a soil sample (500g), sand loam in texture containing 15% soil water. One hundred seeds were sown in each of four replications. Seeds were allowed to imbibe water from the soil surface for 5 d at 25 C in a relative humidity of 100%. Radicle elongation, root hair emergence, and attachment characters were observed over time. Seeds were classified by radicle attachment, including attachment of root hairs and time required for soil penetration: entirely attached type I, half attached type II, and no attachment type III. We monitored percent germination, time required for the radicle to pierce the soil, soil piercing rate, radicle length, and the radicle length in and out of the soil.

Results In the initial stage when seeds were placed on soil surface, the radicle elongated but did not pierce the soil. Two days later, root hairs emerged on the radicle of *Astragalus adsurgens*, and their length and area of emergence increased. Root hairs emerged little on the radicle of Sainfoin. Type I seedlings were significantly greater for *Astragalus adsurgens* than Sainfoin. Type II seedlings were greater for Sainfoin than *Astragalus adsurgens* for most characteristics, except of time required for soil piercing. Type I were significantly greater than type II in time required for the root to pierce the soil and the ratio of root in and out of the soil for *Astragalus adsurgens*; root of Sainfoin pierced the soil rapidly and deep. Type I and II seedlings of *Astragalus adsurgens* were significantly better than type III for the ratio of root and radicle length, whereas the response was opposite in Sainfoin.

Table 1 Attachment of various types germinated seeds of *Astragalus Adsurgens* and Sainfoin.

| Materials | Proportion in germinated seeds(%) | | | Soil piercing time(d) | | Soil piercing rate (%) | | Root length of soil piercing/root length of baring | | Root length/radicle length | | |
|----------------------|-----------------------------------|--------|-------|-----------------------|-------|------------------------|--------|--|-------|----------------------------|-------|-------|
| | I | II | III | I | II | I | II | I | II | I | II | III |
| Astragalus Adsurgens | 38.0Aa | 27.8Bb | 8.8Ca | 2.2Aa | 1.3Ba | 50.5Aa | 36.8Ab | 2.0Ab | 0.4Bb | 1.3Ab | 1.3Ab | 1.3Ba |
| Sainfoin | 29.3Bb | 46.0Aa | 8.3Ca | 1.3Ab | 1.4Aa | 35.0Bb | 55.3Aa | 4.7Aa | 0.6Ba | 2.4Bb | 2.7Ba | 9.9Aa |

Note: Capital letters indicate variance among types; Lowercase indicate variance between two materials

Conclusions Mengnong Sainfoin is better than *Astragalus adsurgens* for sowing on the soil surface because its seeds germinated rapidly and seedling were strongly attached to the soil surface. Therefore, Mengnong Sainfoin was the most suitable forb for sowing on the surface of soil.

Reference

W. Liu, Y. Guo and G. Wang 2003. Studies on aerial seeding technology of sandy grassland of loess plateau. *Grassland Science* 11, 67-91.