

Pasture establishment - identifying the weak link

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Establishment of pasture species is a very complex process involving interactions between many factors. Because of this complexity, the definition of research objectives becomes difficult and any approach which objectively identifies limitations in the overall establishment process would be valuable.

Pasture establishment is a widely used but unfortunately, ambiguous term and may be defined in many ways depending on personal interests and needs.

The crucial objective in pasture establishment is to ensure that a sufficient population of sown seedlings survive the establishment phase, thereby forming the basis for greater production in later years (1). With this objective in mind, pasture establishment may be defined as all stages in seedling development from seed imbibitions to a stage of seedling development when seedlings present have a high probability of survival and the sown seedling population has stabilized. Using this definition, the criteria for establishment is focused on seedling survival and the population dynamics of sowed seedlings. The common use of establishment to refer to emergence and early growth is unacceptable in a pasture context as it ignores post emergence mortality which may occur over a period of 12 months and result in less than 1% of the emerged seedlings surviving (2).

Studies of the population dynamics of sown seedlings focus attention of periods of high seedling mortality, of critical stages in seedling development, and provide a foundation for evaluating management options and identifying future research directions. Often, it is useful to divide the establishment system into a number of separate processes. Kunelius et al.(3) identified three broad processes in the development of sown seed into a mature plant. These were seedling emergence, survival of the emerged seedlings and growth of the surviving seedlings. Knowledge of the dynamics of sown seedling populations will indicate the relative importance go these processes.

Recent research has demonstrated the application of population biology to the evaluation of a number of methods of sowing perennial pasture grasses. In this particular case, treatments which significantly increased seedling emergence (i.e. tillage implement), did not generally correspond with increased final establishment. In contrast, established plant density was greater in treatments which increased survival of emerged seedlings (i.e. herbicide application). This finding supports the allocation of a low priority to research aimed at increasing emergence and emphasizes the need for research aimed at maximising survival of emerged seedlings.

1. Jones, R.M. 1975. Aust. J. Exp. Agric. Anim. Hush. 13, 54-63.
2. Cook, S.J. and Dolby, G.R. 1981. Aust. J. Agric. Res. 32, 749-59.
3. Kunelius, H.T., Harris, W., Henderson, J.D. and Baker, C.J. N.Z. J. Agric. Res. 10, 253-63.