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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

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The invasive potential of *Elaeagnus angustifolia* in the natural pastures of the Rio Negro Valley , Argentina

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Key words : *Elaeagnus angustifolia* ,invasive potential

Elaeagnus angustifolia L . (Russian olive , Narrow leaved oleaster) is a deciduous tree that grows mainly in the summer . It was introduced as an ornamental into the Middle Valley of the Rio Negro , Argentina (39°30' S ; 65°30' W) , and has become naturalized in extensive regions along the river margins . This invasive species is threatening the biodiversity , structure and function of the ecosystem in areas fully occupied by natural vegetation . When the first small plant patches appeared in 1970 , they were left unnoticed or not considered as an invasive , harmful species by land managers . Therefore , no control methods were applied . The land surrounding the river is utilized for livestock breeding using the natural grassland as the main food source for animals . In the invaded areas , changes of species composition seriously impaired the meat industry .

The rapid rate of invasion and successful naturalization of *E . angustifolia* has been attributed to the following main factors : a) To the intrinsic predeterminate genome suitability of the species that makes it suitable to the regional extrinsic ecological factors of climate , soil and land use , and allow this species to behave as a colonizer with rapid population growth . b) The great potential for sexual reproduction which secures the persistence of the species through the presence of a persistent soil seed bank . Adult plants may produce between three and five millions fruits , each one containing a solitary heavy seed . c) Hydrochorous long distance spread has been favored by the plants growing near to the water , the seasonal river flooding , and in particular for the buoyancy of the drupaceous fruit because of the presence of an aerenchyma and pubescent cover . Predators also act as dispersal agents . Seeds are not affected by their digestive systems . d) Under laboratory conditions freshly collected seeds showed a high rate of germination (75 %) . e) The plants have a successful three years juvenile establishment phase in the absence of sexual reproduction . By the end of the first plant growth cycle seedlings were 30 to 60 cm tall , displaying a vigorous root system with both horizontal and vertical growth and were already able to have a symbiotic association with a *Frankia* actinomycete . f) Vegetative propagation through a plagiotropic gemmiferous root system , assures the species spreading a few meters out from the mother plant of the most successful genotypes that have adapted to a given local environment . New plant shoots arise from subterranean adventitious buds of individuals of different ages ; however , this is most common in one to five years old plants . g) Physical fragmentation of the roots releases bud dormancy and new shoots rapidly establishing in the disturbed area . h) Adult plants exhibit multiple relative allometric forms as an adaptive response to environmental heterogeneity . i) Root architecture reacts plastically to different soil physical conditions . There is a preference for sandy , loose and humid soil ; although , the plants may well tolerate heavy soils , flooding and high salt and sodium content . Altogether , the ecological strategies of *E . angustifolia* studied indicate that it will continue its expansion in the valley of the Rio Negro , and in similar areas .