

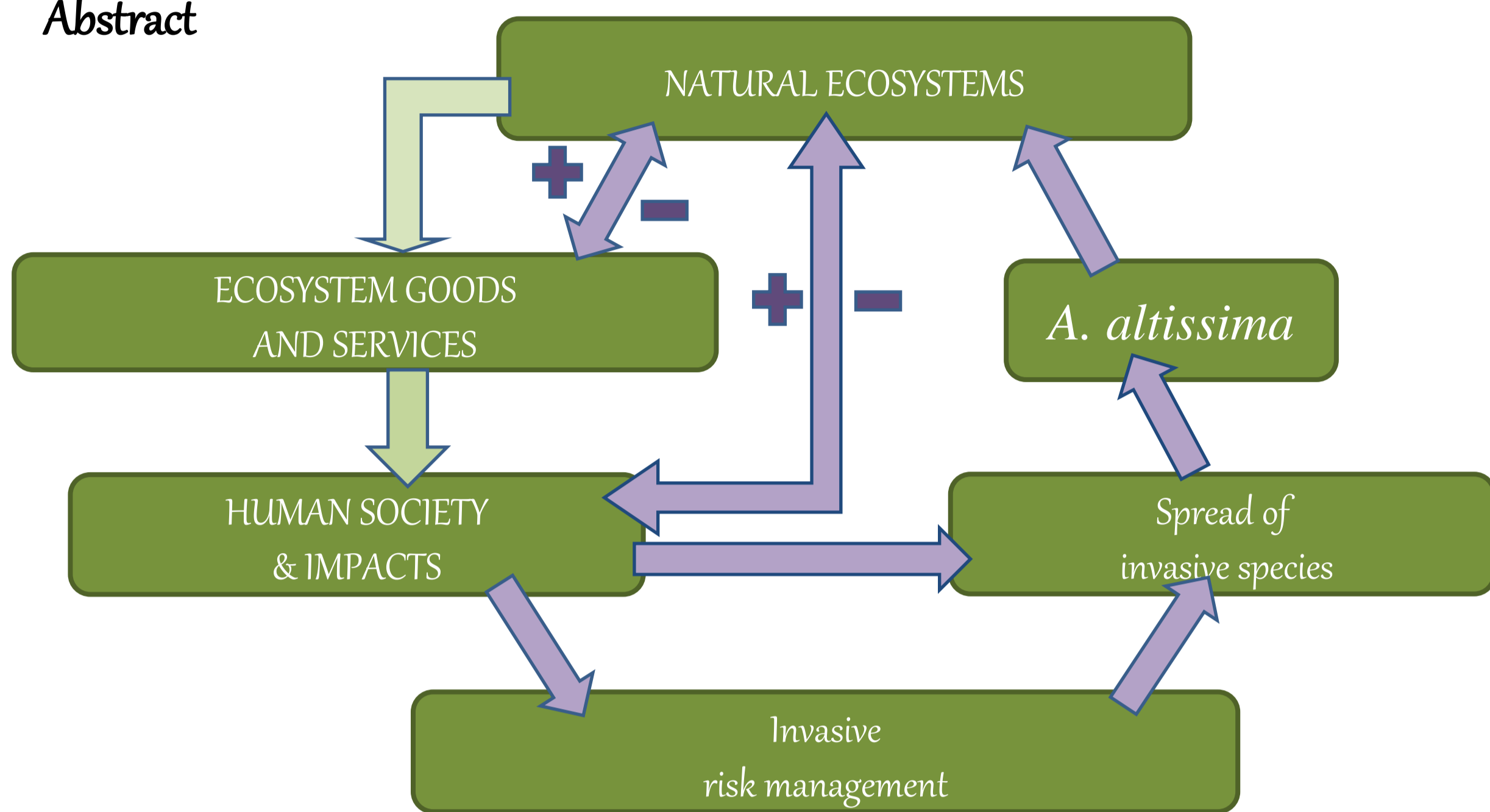
Ecosystem services provided by alien invasive plant species

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Abstract



ALIEN INVASIVE SPECIES are considered to be one of the largest threats to biodiversity globally, but have also a number of potential ecosystem services useful to human well-being.

Invasive risk management comprises balanced actions in prevention and removal of alien invasive species and possible uses in boosting ecosystem services (Sladonja et al. 2015).

Ailanthus altissima - Tree of Heaven or Tree of Hell?

Tree of Heaven (*Ailanthus altissima* (Mill.)) is considered one of the worst invasive plant species in Europe and it is also listed as an invasive plant in North America and many other countries (DAISIE 2014). It is a tree native to Southeast Asia, introduced in Europe and North America in the 18th century. It is rarely present in natural environments outside cities, although generally highly abundant in urban areas and other disturbed sites, such as agricultural fields and transportation corridors. In cities it can cause problems by damaging the infrastructure and archeological remains with its roots, causes allergic reactions, respiratory problems and skin rashes in the local population.

INTRODUCTION

Ecosystem services are the direct and indirect contributions of ecosystems to human well-being. They support directly or indirectly our survival and quality of life.

Ecosystem services can be categorized in four main types:

Provisioning services are the products obtained from ecosystems such as food, fresh water, wood, fiber, genetic resources and medicines.

Regulating services are defined as the benefits obtained from the regulation of ecosystem processes such as climate regulation, natural hazard regulation, water purification and waste management, pollination or pest control.

Habitat services highlight the importance of ecosystems to provide habitat for migratory species and to maintain the viability of gene-pools.

Cultural services include non-material benefits that people obtain from ecosystems such as spiritual enrichment, intellectual development, recreation and aesthetic values.

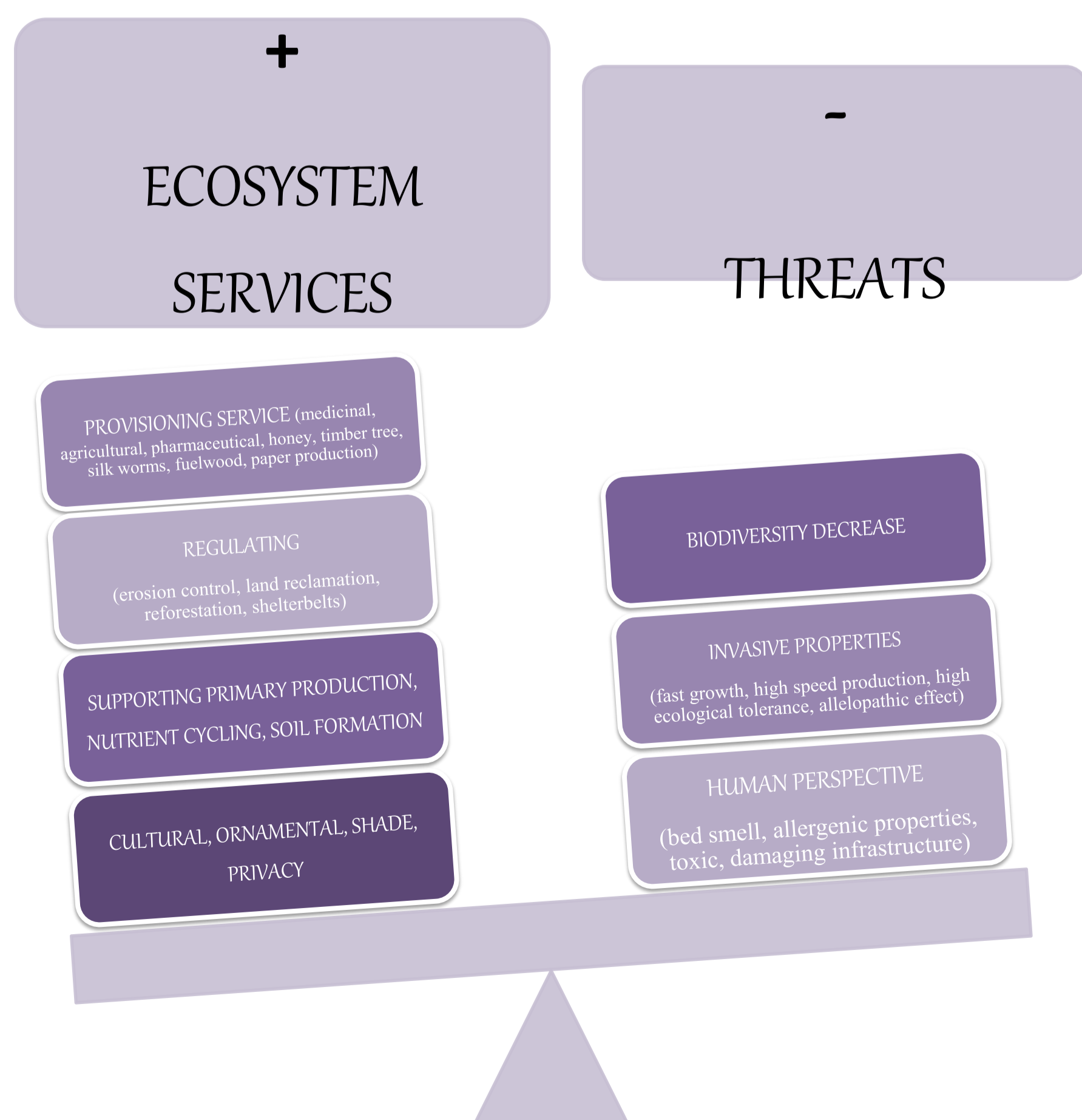
But...it could be useful...

Ailanthus altissima contains a very powerful herbicidal compound, aianthone, which can compete with synthetic herbicides (Heisey 1996). The herbicidal effects of *A. altissima* tissue extracts have been extensively researched, and



while the obtained results on the intensity of these effects show potential for future applications, several obstacles were also identified, such as low-selectiveness and fast degradation by soil microorganisms.

These obstacles, if eliminated or modified in the future, would make *A. altissima* a good source plant for environmentally friendly herbicides.



RESULTS

Table 1. Preliminary results on bioassay testing of *A. altissima* herbicidal activity on alfalfa and wheat.

BIOASSAY

		Germination			
		Average	St.dev.	sig. 5%	sig 1%
Soil with root fragments after 6 days	Alfalfa				
	Roots	21	2,08	b	b
	Control	27	0,58	a	a
	Wheat				
Soil with root fragments after 11 days	Roots	23	4,16	a	a
	Control	29	1,00	a	a
	Alfalfa				
	Roots	22	3,61	a	a
Soil with root fragments after 11 days	Control	23	1,00	a	a
	Wheat				
	Roots	27	1,53	a	a
	Control	25	6,66	a	a

We performed a bioassay testing *A. altissima* herbicidal activity on alfalfa and wheat seed germination. In the soil *A. altissima* root fragments were mixed and left for 6 and 11 days. After these periods germination of tested plants were measured. Here we present a preliminary results (Table 1). While wheat germination was not significantly influenced by *A. altissima* presence, germination of alfalfa was significantly reduced in the soil with *A. altissima* fragments. Still, after 11 days, probably due to the phytotoxins fast biodegradation this effect was missing. Aianthone is shown to be very biodegradable, with its toxicity persisting 3-5 days, as demonstrated by Heisey (1996). Short persistence may be advantageous from the standpoint of safety to humans and the environment, but it can limit herbicidal efficacy.

CONCLUSIONS

Nowadays it is very difficult to prevent biological material from travelling and also to stop already present non-native species from spreading. This means that we must find models to re-establish the ecological balance, and the positive aspects of invasive trees for some ecosystem services have to be weighed against the loss of other ecosystem services.