



Vademecum: A general guide to IAP eradication in Natura 2000 sites – the Malta experience.

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IAP Vulnerability to Eradication

1-2	3-4	5-6	7-8	9-10
Very low vulnerability VERY DIFFICULT TO ERADICATE	Low vulnerability	Medium vulnerability	High vulnerability	Very high vulnerability VERY EASY TO ERADICATE
Soil Bulbils & Rhizomes	Root fragmentation and suckering	Floating seeds and Soil seed banks	Bulbous plants	Leaf, stem and root Succulents

Vulnerability index for eradication of IAPs subdivided into five vulnerability categories with 1-2 showing least vulnerability and therefore highest difficulty to eradicate and 9-10 showing the highest vulnerability and therefore the greatest ease for eradication. Examples are given for each vulnerability category.

IAP Vulnerability to Eradication

	Contributor Categories to Vulnerability Index	2 = High	1 = Moderate	0 = Low	TOTAL
A	Removal of above ground biomass				
B	Removal of below-ground biomass				
C	Collection of propagules				
D	Uprooting of seedlings/Rhizomes				
E	Suppression of regrowth/reinvasion				

Five contributors to the vulnerability index of an IAPs marked A to E in table. A vulnerability contributor value of 2 indicates the species has high vulnerability in that contributor category, 1 a moderate vulnerability contributor whilst 0 indicates very low vulnerability for that contributor.

IAP Vulnerability to Eradication

IAP Species & Contributor Value	A	B	C	D	E	Index	Ease of Eradication	Vulnerable stage of intervention
<i>Carpobrotus acinaciformis</i>	2	2	2	2	2	10	Very Easy	Severe plant from roots, roll up and allow to rot
<i>Agave sisalana</i>	2	2	2	2	1	9	Moderately Easy & Intensive	Remove totem, propagules, leaf bases and offsets
<i>Leucaena leucocephala</i>	2	1	2	2	1	8	Moderately Easy	Collect pods when still green, severe tree at base
<i>Cardiospermum grandiflorum</i>	1	1	2	2	1	7	Needs persistence	Collect capsules, severe & uproot stem, seedlings
<i>Ricinus communis</i>	1	1	1	1	1	5	Difficult	Collect semi ripe inflorescence and seed capsules
<i>Acacia salignia</i>	2	0	0	1	1	4	Difficult	Lop off main trunk, remove tillers & seedlings
<i>Ailanthus altissima</i>	1	0	1	1	0	3	Very Difficult	Lop off trunk and suckers before leaf emergence
<i>Oxalis pes-caprae</i>	1	0	0	1	0	2	Extremely difficult	Use herbivores and light exclusion to weaken plants
<i>Arundo donax</i>	1	0	0	0	0	1	Extremely difficult	Cut off canes & remove new shoots

Table showing the value of the different contributors to the vulnerability index of nine IAPs. Five vulnerability categories are shown with the most vulnerable to eradication in green and the least vulnerable to eradication in red with additional notes on vulnerable stages.

Wied Babu N2000 Historical Site Characteristics

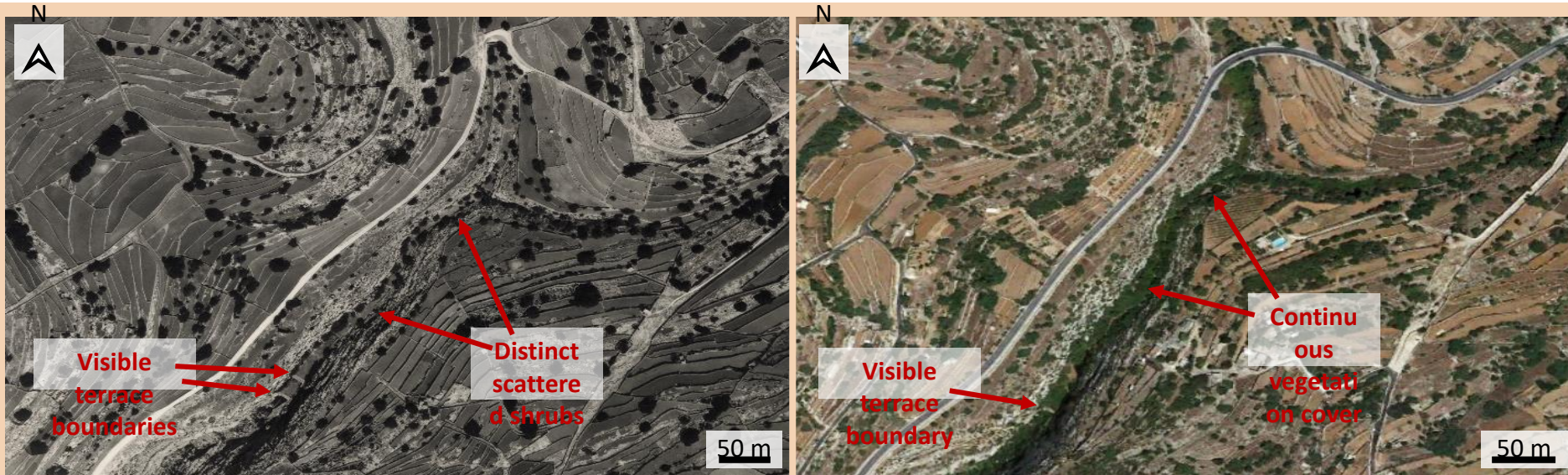
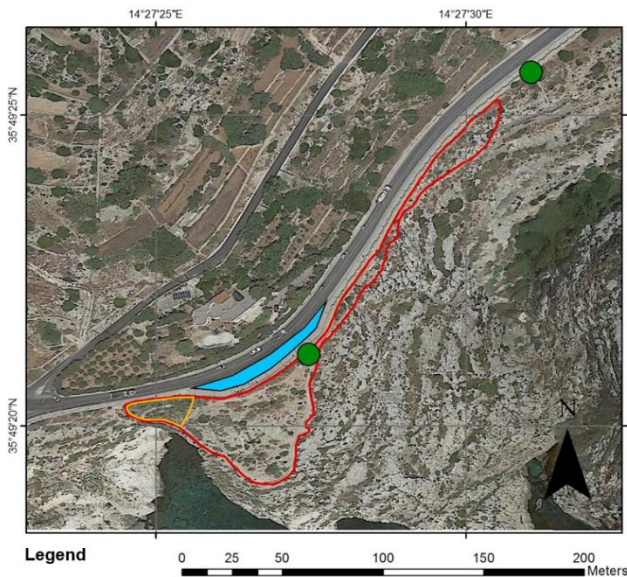


Figure 3: Wied Babu historical images from 1957 (left) & 2019 (right)



Cardiospermum grandiflorum has invaded the valley floor with a continuous carpet of growth killing or weakening undergrowth.

Agave and Acacia planted on the upper slopes of the valley have matured and extended their range.



Cardiospermum grandiflorum Green / Wet Capsule Collection



transported offsite.

Capsule collection when still immature or when wet if mature reduced seed dispersal by about 90%



Figure 5: Manual removal and collection of *C. grandiflorum* plant material.

Cutting Main Stem & Root Apparatus



Severing of main stem at ground level, removal of root apparatus causes plant to wilt allowing undergrowth to recover

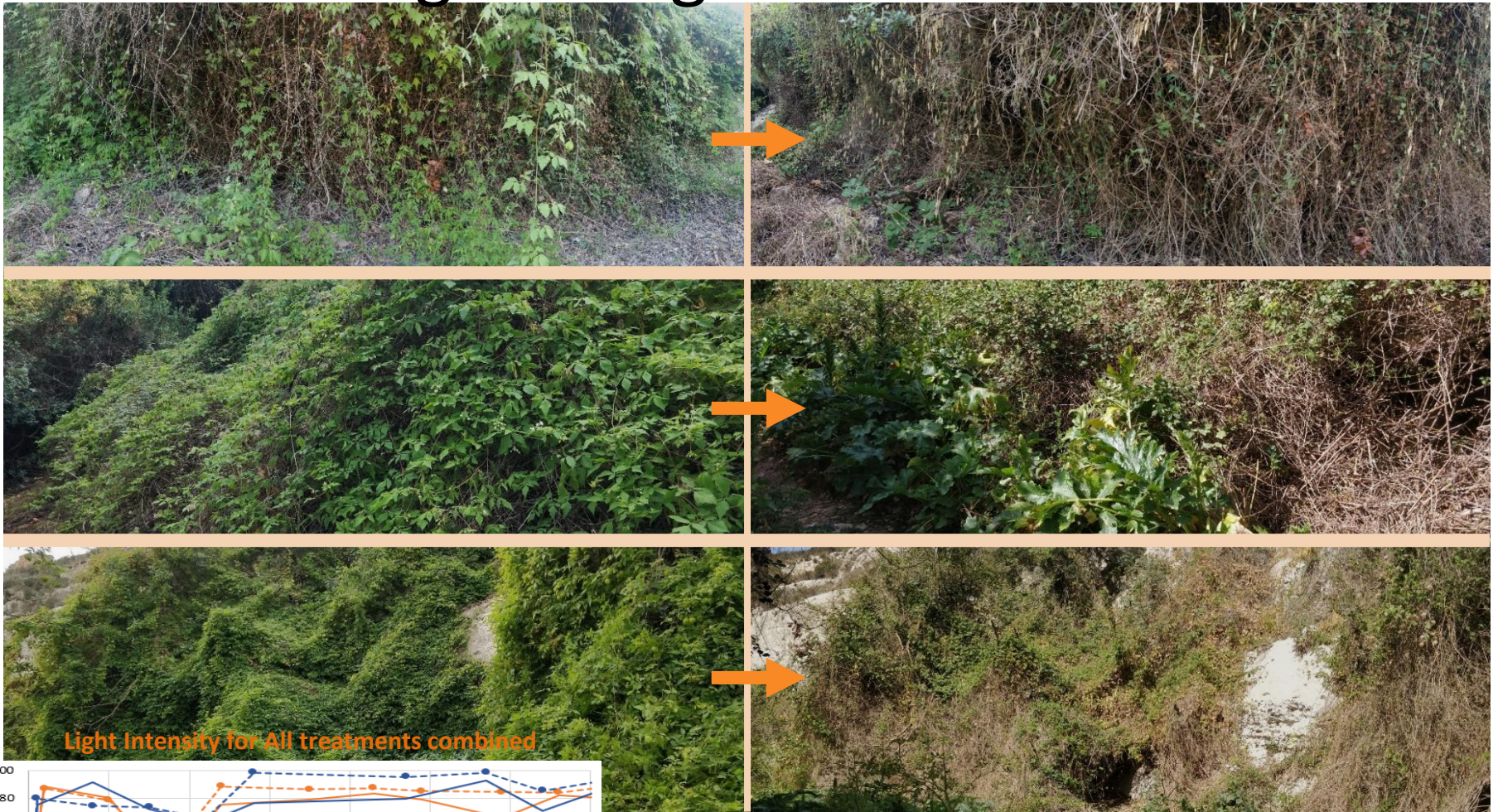


Uprooting of seedlings

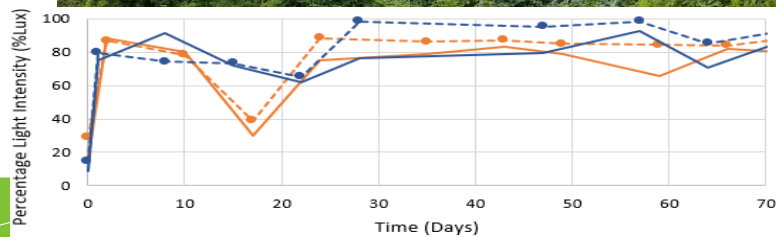


Uprooting of Seedlings

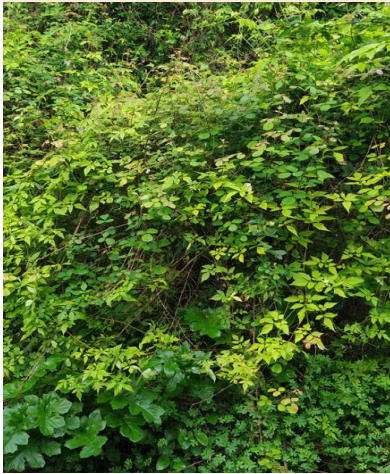
Changes in Light Penetration



Light Intensity for All treatments combined



Untreated control



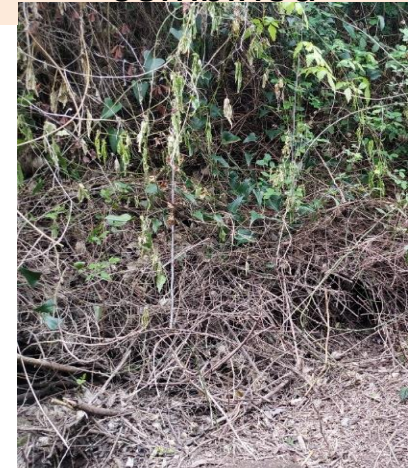
Severing main stem only



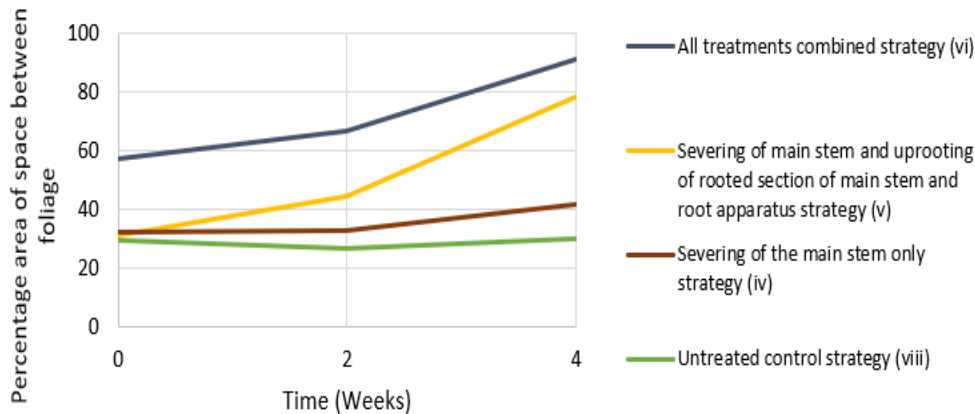
Severing and uprooting main stem and root apparatus



All treatments combined



Images taken two weeks post-treatment for the test plots on the south aspect of the valley.



Variation in the % light intensity from the start of the **severing main stem and uprooting of rooted section of main stem and root apparatus** strategy (v) till 4 weeks post-treatment. The values are expressed as a percentage of light intensity measured at 1.00 m height on the open path.

Eradication of *Agave sisalana*



At maturity the original mother plants have create formidable and impenetrable clumps, produce totem poles with large number of rooted propagules as well as stolons and offsets.



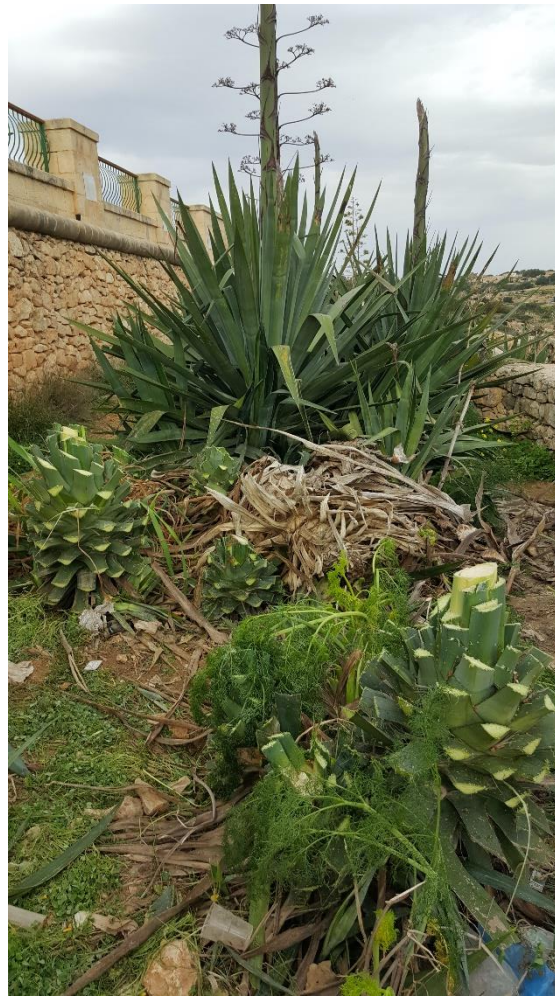
New Interventions on Agave March 2023





One Agave totem pole is estimated to produce on average around 800 fully rooted propagules





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Wied Babu First Area – Involvement of stakeholders





Removal of *Acacia saligna* requires follow-up Monitoring



The largest problem with *Acacia* is that the massive soil seedbank will remain active for many years once mother plant are removed.



Thank you for your attention