VERBESINA ENCELIOIDES (GOLDEN CROWN BEARD) ON THE ABROLHOS ISLANDS

A report prepared by Greg Keighrey and Nigel Sercombe,

Department of Conservation and land Management

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Introduction

Verbesina L. (Asteraceae) is a large genus of approximately 150-300 species (depending on generic limits) native to North, Central and South America. *Verbesina encelioides* (Cav.) Benth. et Hook. ex A. Gray (Golden Crown Beard, Wild Sunflower, American Dogweed, Crown Beard) is a variable annual or short lived perennial herb. The species is divided into two varieties, var *encelioides* (which has leaves with a wing or auriculate at the base) and var *exauriculata* Rob. Et Greenm., which lacks the basal wing. Both are native to the southern United States (Mississippi, Florida, Texas and New Mexico) and northern Mexico. Current American floras note that these naturally weedy taxa have been introduced outside their native ranges.

There is evidence that *Verbesina encelioides* root exudates are allelopathic (Inderjit and Inderijit, 1999) to other plants. Foliage and flowers are toxic (Everist, 1984), causing both death and photosensitivity in stock. The toxic principals are unknown but related plants contain cyanogenic glycosides and *Verbesina encelioides* has very high levels of nitrates present in leaves and stems.

Plants set very large amounts of highly fertile seed (Al-Farraj *et al*, 1988), which is fortunately short lived most only surviving for a year after setting and dispersal.

1. Status as a weed worldwide

Golden Crown Beard is naturally weedy, even within it's native range of the southern United States and the species has spread along roadsides into adjacent states, such as Arizona, Arkansas and California.

The species has been recorded as a weed of Date Palm Gardens (Al-Farraj *et al*, 1988) and is also regarded as a serious weed in the Asir Region of Saudi Arabia (Chaudhary and Akram, 1987). It is also recorded as a weed in Argentina.

It was introduced to Hawaii, probably in the 1870's and is now widespread throughout all the main Hawaiian Islands and much of the rest of the Archipelago. In the Hawaiian region *Verbesina* is considered a major threat to seabird nesting areas on the north-western Hawaiian Archipelago as it grows in dense monotypic stands that out-compete native coastal plant species and degrade nesting habitat. It has been reported for Kure Atoll (Green Island) Wildlife Sanctuary and Midway Atoll Wildlife Sanctuary.

2. Status as a weed in Australia

All material in Australia appears to be variety *encelioides*. Groves et al. (2000) listed *Verbesina* from all States except Tasmania.

STATE	QLD	NSW	VIC	TAS	SA	WA	NT
STATUS	4A	3A	3A	----	1	2	?*
SPREAD					4		

Rating:
Status
4: naturalised and known to be a major problem at 3 or less locations
3: naturalised and known to be a minor problem at 4 or more locations
2: naturalised and known to be a minor problem at 3 or less locations
1: naturalised but not considered a problem
(* Recorded as present in NT but status unknown)
A: Agricultural or ruderal weed, no known threat to native plants.
Spread - 4: still expanding

The species is a declared noxious weed in New South Wales. However, as an environmental weed, it was listed as a minor weed, being mainly found on agricultural lands or highly disturbed sites such as roadsides or vacant blocks.

3. Status as a weed in Western Australia

Most treatments of the Weed in Australia, eg Parsons and Cuthbertson (1992) do not record *Verbesina* from Western Australia. In fact the earliest herbarium record for *Verbesina* in Western Australia was made in 1984 in Craigie (a suburb of Perth, Keighery 6961), and the second from the Geraldton area in 1988 (Keighery 10459). The species was already abundant around Geraldton on vacant land and road verges at this time, suggesting that the species had become naturalised in the preceding decade.

The species is now abundant around Geraldton on sandy roadsides and vacant lots and is common in similar sites south to Dongara. There are continuing scattered records around Perth and the species has been recently recorded north of Mandurah, suggesting that the species is mainly spread by soil movement along roads. Spread is apparently still continuing.

4. Status on the Abrolhos

Verbesina was apparently introduced to East Wallabi Island in gravel used to resurface the airstrip in 1999. In November 2001 Staff of the Department of Conservation and Land Management (Nigel Sercombe, Greg Keighery and Maria Lee) and the Fisheries Department (Scott Shervington) surveyed the extent of *Verbesina* around airstrips on East Wallabi, North Island and Rat Island.

We did not locate *Verbesina* on either North Island (Weeds here were *Chenopodium murale* (Nettle Leafed Goosefoot) and *Sonchus oleraceus* (Sow Thistle) or Rat (Weeds here were *Reichardia tingitana* (False Sowthistle) and

Sonchus oleraceus (Sow Thistle). These weeds are already widespread on the Abrolhos.

However, a severe but localised infestation of *Verbesina* of over 3,000 plants has occured around the airstrip on East Wallabi (see maps at attachment 1 and 2, figures 1-4 at attachment 3). Fortunately the infestation is localised to disturbed areas on and beside the airstrip. In this context, it is feasible to plan for the complete eradication of the weed without compromise to conservation and other values. *Verbesina* is a disturbance opportunist and care must be taken to ensure the vegetated area of East Wallabi is disturbance (eg fire, ground/soil disturbance) free during the eradication period. Any disturbance event will facilitate and enhance the opportunity for germination of seed present in the native vegetation beyond the airstrip. This would have significant implications for eradication or control of the weed.

5. Eradication

The literature indicates that a number of chemical applications and other control strategies have been recommended for the control of *verbesina.* Swarbrick and Skarratt (1994) recommend hand pulling if flowering and subsequent disposal or incineration of the plants. They recommend to wick wipe with 33% roundup in water before flowering. Everist (1981) and Parsons and Cuthbertson (1992) recommend spotspray with ester 2,4-D, MCPA amitrole and atrazine or glyphosate (roundup). Everist (1981) recommends 2,4-D @ five litres of 50% amine to treat 200m^2. For high volume equipment Everist recommends 50% amine mixed with water at a rate of 1:500 (10 ml. to 5 litres) and plants sprayed until just wet.

Given the extent of the infestation hand pulling is not likely to present a realistic control strategy and 2, 4-D is not approved for use in Western Australia.

However, of the chemicals recommended above, glyphosate is identified as providing effective control and could be applied in this situation. The situation may also warrant consideration of the use of light residual chemical treatment (such as simazine) as a strategy to address post-spray germination. These chemicals are non-selective and the use of spray techniques will need to give consideration to the potential for drift to impact native vegetation adjacent to the airstrip. The airstrip is located above an island caste system with the potential for leaching into the marine environment. The use of all chemicals requires thorough impact evaluation to ensure flow-on impacts of chemical use do not occur.

6. Conclusions

Prior to the record on the Abrolhos there were few suggestions that the species posed a major environmental threat in Australia and Western Australia. However, the species is known to be a major threat to seabird habitat elsewhere. Seabird islands have high levels of natural disturbance, soil enrichment by guano and *Verbesina* acts as a gap filler occupying nesting or burrowing sites.

The species is toxic, which posses a threat to the mammals (Tammars and *Rattus fuscipes*) on East Wallabi Island, as both eat plants. This also means that grazing by these animals will not control the species if it spreads. There are also seed eating local races of Painted Button Quail (a listed subspecies) and Brush Bronzewing on East Wallabi Island.

Verbesina represents a significant potential threat to biodiversity conservation and other values on East Wallabi Island. The potential for the weed to be introduced to other islands is real and is likely to have similar detrimental consequences as is the potential on East Wallabi.

Given the allelopathicity and toxicity *Verbesina,* it's potential to degrade seabird-nesting habitat, compete with native vegetation, altar the Abrolhos landscape and impact on other conservation values the weed represents a major potential environmental threat to the Islands. If eradication is to be achieved, the commitment to that outcome must be persistent, aggressive and sustained until eradication is complete. For success, eradication strategies must be directed at ensuring no individual *verbesina* plants are afforded the opportunity to set seed. Planning for the complete eradication of the weed should be undertaken as a matter of urgency with a view to undertaking control operations, if required, following 2001 summer rains and/or over autumn/winter 2002 and until eradication is complete.

7. Recommendations

(i) A plan for the eradication of V*erbesina* at the Abrolhos should be drafted as a matter of urgent priority.

(ii) There should be a preparedness to undertake control operations in the event of summer rain and subsequent *Verbesina* germination in early 2002.

(iii) Environmental hygiene protocols to prevent the introduction of exotic species need to be developed in respect to all operations at the Abrolhos.

References

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Figure 1 East Wallabi Airstrip with quadrats searched for *Verbesina* numbered 1-12b.

Figure 2 East Wallabi Airstrip. Numbers of *Verbesina* plants recorded. Hatched areas dense populations, x are individuals. Plants are recorded as Flowering (F), non flowering adults (NF) or immature seedlings (S).

Attachment 3

Figure 1. Abrolhos specimen, *Verbesina ecelioides*

Figure 2: Flowering *Verbesina*, East Wallabi Airstrip

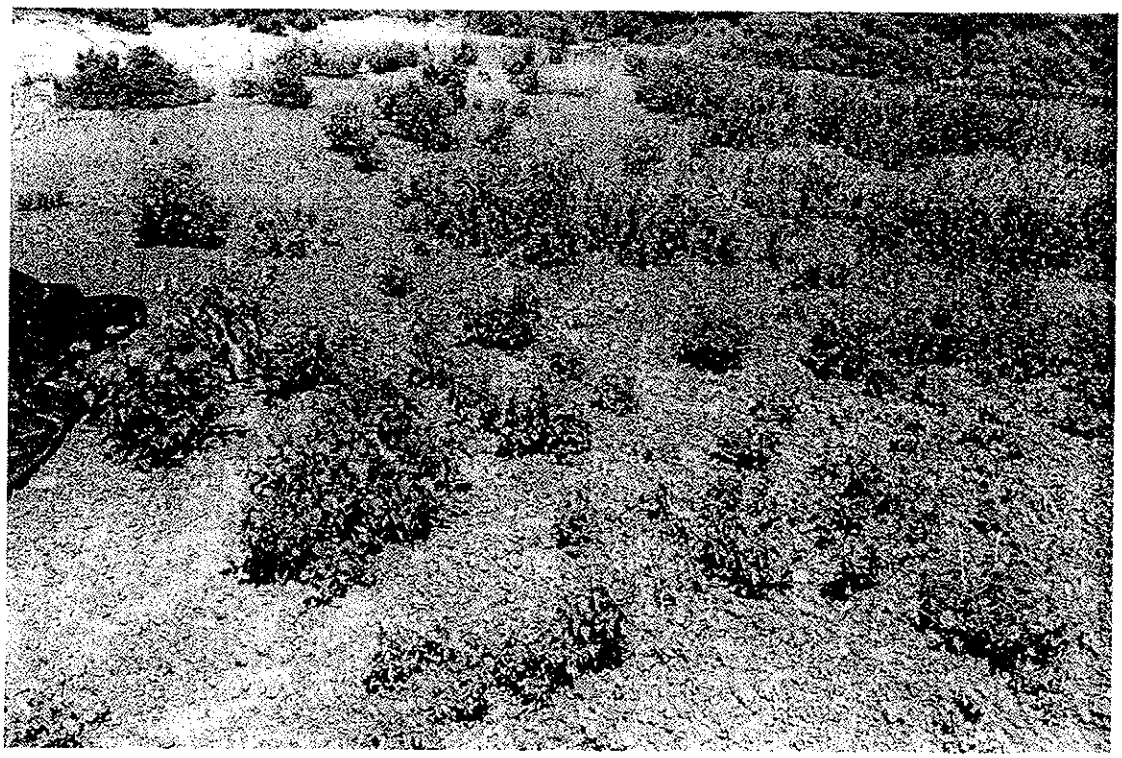


Figure 3: Severe *Verbesina* infestation, *East Wallabi airstrip*

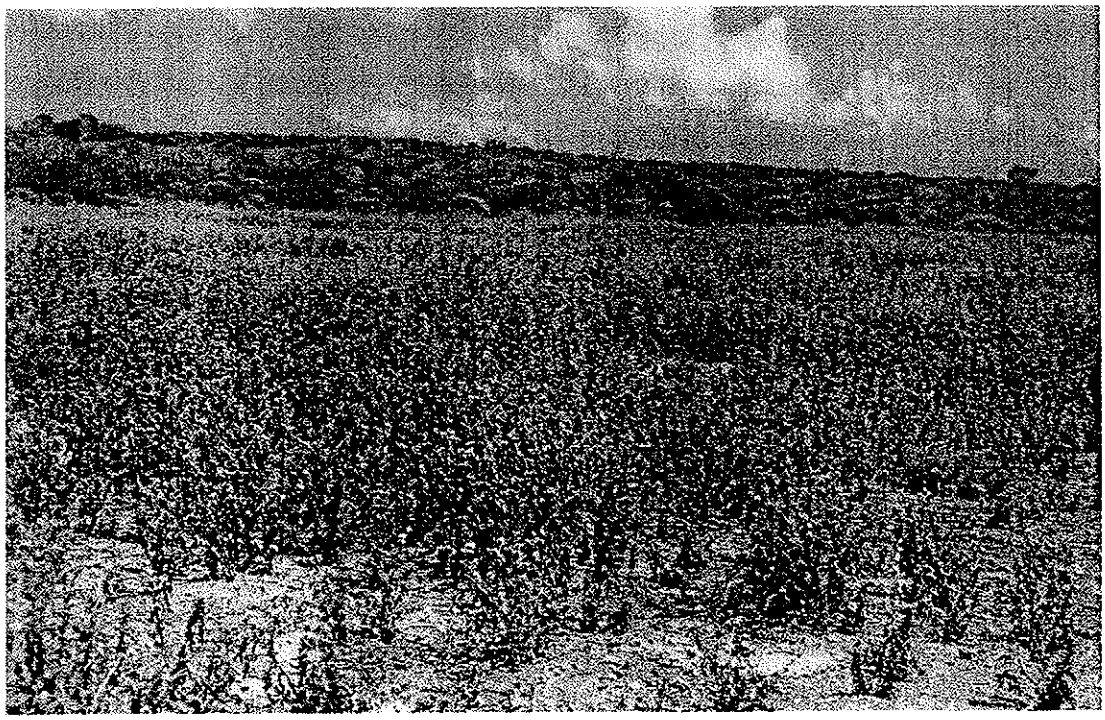
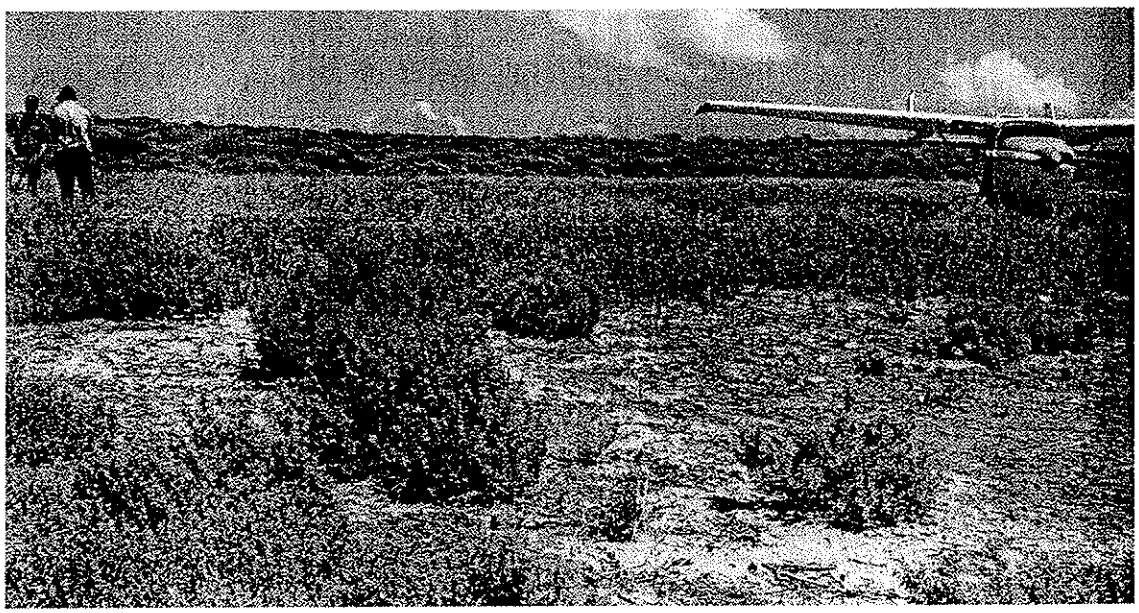


Figure 4: Severe *Verbesina* infestation, *East Wallabi airstrip*



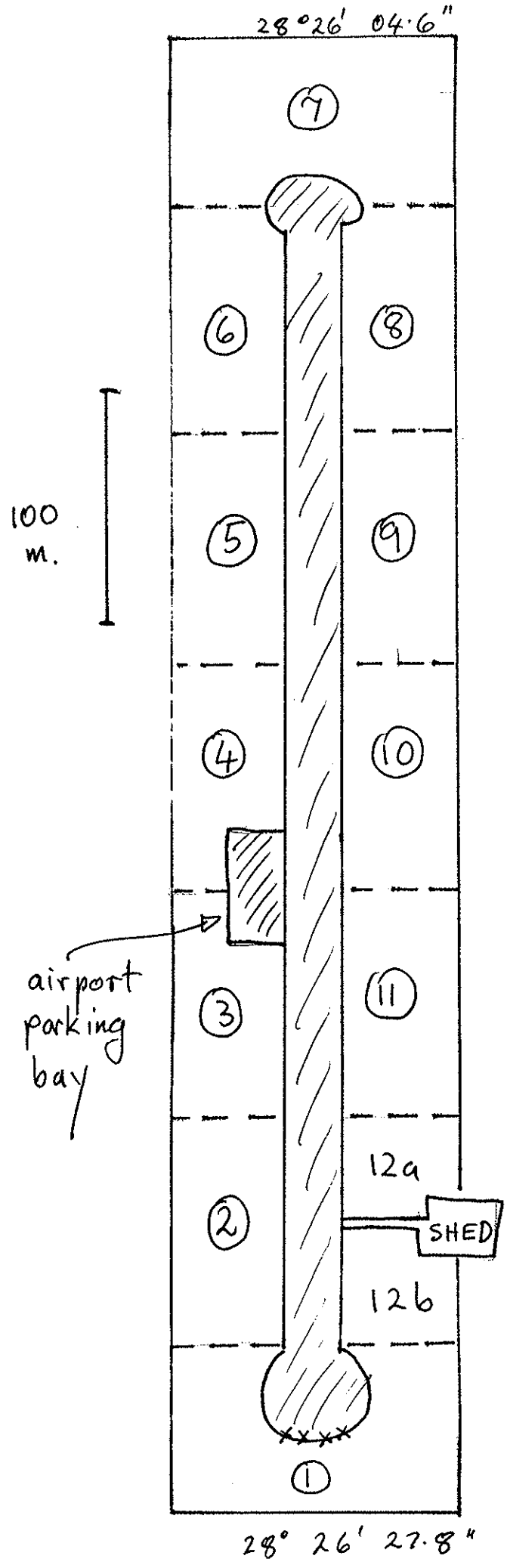


Figure 1:
East Wallabi
Airstrip

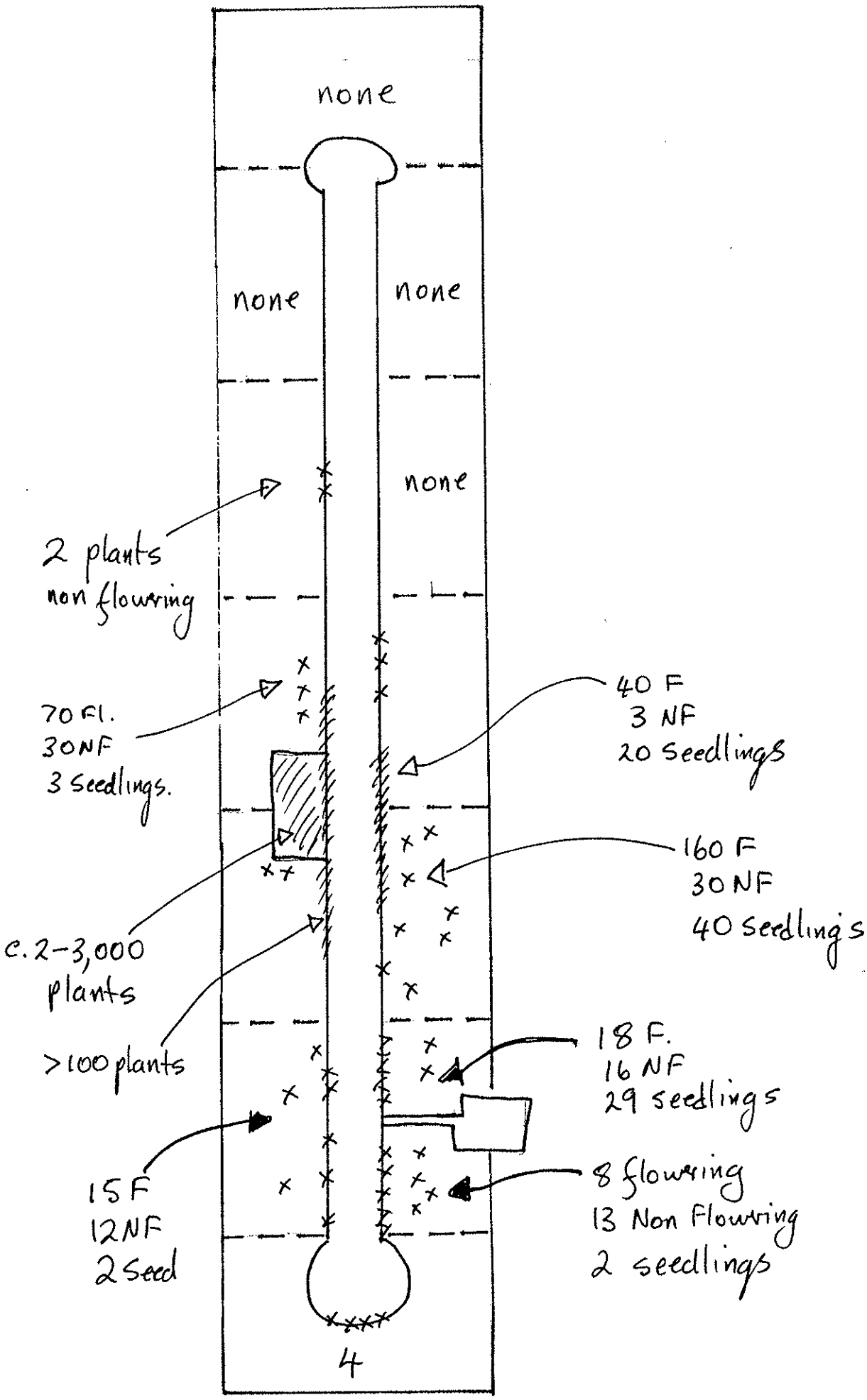


Figure 2: Numbers Plants Recorded