

THE IDENTITY OF THE MULLALOO BEACH (WESTVIEW CARPARK) *ATRIPLEX*

Greg and Bronwen Keighery
Department of Environment and Conservation
August 2009

Background

We were requested to undertake a study of the *Atriplex* species present on the fore-dunes of Mullaloo Beach at Westview car park by the Joondalup Coast Care Forum who had been advised by the Joondalup City Council that *Atriplex isatidea* did not occur naturally at Mullaloo and material produced for revegetation was not of Joondalup provenance. Members of the Coast Care Forum also felt that more than *A. isatidea* (possibly an intermediate species/hybrid to *A. cinerea*) naturally occurred in this area.

Results

Based on the Flora of Australia, Flora of the Perth Region and Florabase, the Joondalup dunes in the Perth Region could be expected to host three species of *Atriplex*:

1. *Atriplex cinerea*

A low growing spreading suckering shrub to 1 metre tall by 1-5 metres wide, found around the coast from Shark Bay to the WA/SA border and also around inland salt lakes. In the Perth region the species is normally associated with outcropping Tamala Limestone along the coast.

Atriplex cinerea has silvery grey leaves that are alternately arranged along the stem, with a dense scaly silvery sheen on both surfaces. Leaves are highly variable ranging from narrow-elliptic to ovate, 12-40 mm long and 3-12 mm wide. Female flowers are borne in small axillary clusters with the males in short terminal spikes. Fruits are ovate to diamond shaped thick and swollen and lack appendages.

2. *Atriplex isatidea*

A tall shrub to 2 metres tall, with 1-5 stems, normally not sprawling or suckering, ranging from Karratha to the WA/SA on beaches. More common to the north of the Metropolitan area, but sporadically recorded along Perth beaches

Atriplex isatidea has silvery grey leaves that are alternately arranged along the stem, with a dense silvery sheen on both surfaces. Leaves are elliptic to ovate, 25-100 mm long and 15-50 mm wide. The species has long terminal inflorescences unlike the other two species. Fruits are large with 3-4 prominent warty appendages.

3. *Atriplex hypoleuca*

A spreading to prostrate shrub to 1 metre tall and 2-3 metres wide, normally found around estuaries from Perth to Albany. However, there is one collection from the beach at Rockingham (Rockingham Beach, above high water mark, W.M. McArthur, 20-May-1951) suggests the species can be found on beach dunes also.

Atriplex hypoleuca has leaves that are green above with a scaly dense silvery grey below, leaves that are oppositely arranged along the stem. Leaves are variable ranging from-elliptic to ovate a, 10-40 mm long and 3-12 mm wide. Female flowers are in small axillary axils. Fruits are ovate to diamond shaped small and flat.

How many *Atriplex* species are present on Westview Beach?

There are obviously two species of *Atriplex* present at Westview. (Figures 1, 2 and 3).

When these are keyed in the Wilson's Treatment of *Atriplex* for the Flora of Australia (Wilson, 1984). They fall into a group of 5 related species (*A. amnicola*, *A. bunburyana*, *A. cinerea*, *A. hypoleuca* and *A. isatidea*).

The tall few stemmed shrub with large leaves and long terminal inflorescences (Figure 1 and 2) is clearly *Atriplex isatidea*. The related *A. bunburyana* has much smaller leaves and does not occur in the Perth area, but north of Perth.

The other *Atriplex* (Figure 3) is more problematic. It has been suggested to be:

- A hybrid between *A. cinerea* and *A. isatidea* (since it does not seed and has larger leaves intermediate in size between *A. cinerea* and *A. isatidea*)
 - A planted form of *Atriplex amnicola*, *Atriplex isatidea* or *Atriplex cinerea*.

Examination of the plants present at Westview (Figure 3, 4) found that they are all female, and do not apparently set seed, as noted previously. The plants are large clones maintaining themselves by vegetative growth.

Since lack of or reduced seed set (sterility) is common feature of hybrids this feature has suggested that these plants could be hybrids. However, it would appear that they are all female plants rather than sterile hybrids. Wilson (1984) noted that only *Atriplex cinerea* is dioecious, therefore, the using the Flora of Australia treatment the plants must be *A. cinerea*.

However, later publications (Blackall and Grieve, 1988 and Rippey and Rowland 2004) have suggested that some plants of both *Atriplex cinerea* and *A. hypoleuca* can be dioecious (i.e.: separate male or female plants). This requires further study. In any case, *Atriplex cinerea* although not present at Westview is found about 200 metres north of the site on Tamala limestone (Figure 5). Here the plants are "normal" *A. cinerea* but with both male and female flowers present on the same bush.

The clones at Westview have no characteristics of *A. isatidea* (female flowers are in axillary not terminal inflorescences, have no warty appendages on fruit). This suggests that the plants are not a form of *A. isatidea* or a hybrid with *A. isatidea*.

The three clumps identified at West view have larger leaves than *A. cinerea* (Figure 5 and 6) most of which are silvery on both surfaces but less so than normal *A. cinerea*. In this they are somewhat intermediate between *A. cinerea* and *A. hypoleuca*, but the fruits although they do not develop are thickened at the base like *A. cinerea*.

Although the clones are large and spaced another possibility is that they are plantings of *Atriplex amnicola* (River Saltbush) or a hybrid between either *A. cinerea* or *A.*

hypoleuca and this species. This again seems unlikely as *A. amnicola* has leaves with a toothed margin, often arrow shaped and almost hairless. The Westview clones display none of these characters.

Identity of the *Atriplex* at Westview

Looking at all the characteristics of the plants at West view it would appear they are female clones of a large leaved? form of *A. cinerea* or more unlikely the remnants of hybrids with long lost populations of *A. hypoleuca*. However, without genetic typing this would be very difficult to prove.

Finding a population of *Atriplex* that does not readily fit any known species in the Metropolitan region was an intriguing and unexpected result suggesting that the distribution, variation and separation of local *Atriplex* species is still not fully understood.

Recently we have been able to locate this large leaved form on the Back Beach at Bunbury, where the plants are either male or female and no other species of *Atriplex* was present. This suggests that this large leaved dioecious form is both distinct and probably widespread.

Planted or Native?

The few plants of *Atriplex isatidea* at Mullaloo Beach (Westview Beach) are large shrubs with stout basal woody trunks. The plants of *Atriplex? cinerea* are large clones covering several metres across the top of several unstable dunes.

Both *A. isatidea* and this form appear to have been present at the site for a considerable period. The site is also well within the range and known habitat of *A. isatidea*. So although it is still possible that both species were planted several decades ago, it seems less likely, especially in the case of *A. isatidea*. We have been unable to ascertain what plantings have taken place at Mullaloo over the past decades though it is obviously considerable.

The female clones of *Atriplex ?cinerea* at Westview are seed sterile and we feel that maintenance of these in situ is the appropriate management. Since they don't seed they will not spread beyond this local area, even if future study can determine their exact identity and origin.

Material obtained from these plants could be used to augment this population in the local area, rather than using them as general revegetation material, since their female only flowers would have to cross with other plantings to produce hybrid seed.

It would be very useful to be able to view what plantings and surveys have taken place at Mullaloo Beach to enable a more accurate idea of the native status of these species to be obtained.

References

Blackall, WE and Grieve, BJ (1988). How to Know Western Australian Wildflowers, Part 1. UWA Press, Nedlands

Wilson, PG (1984). Chenopodiaceae. Flora of Australia, AGPS, Canberra.

Marchant, NG, Wheeler, JR, Rye, BL, Bennett, EM, Lander, NS and Macfarlane T.D., (1987). Department of Agriculture, South Perth. Flora of the Perth Region. Part One.

Rippey, E. and Rowland, B (2004) Coastal Plants: Perth and the South-West Region. UWA Press, Nedlands.

Atriplex isatidea: Figure 1 Habit and Figure 2 Inflorescence





Figure 3: *Atriplex ? cinerea*: Habit



Figure 4; *Atriplex ?cinerea*: Leaves



Figure 5 and 6; *Atriplex cinerea*: Flowers and Leaves



Figure 7; *Atriplex cinerea*: habit