

## New Weed Alert in Western Australia



### Research Project Report

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In May 2018, a new weed species was reported in the Champion Drive main drain and Wungong Brook (Figure 1) and later recognised as the 'Water Poppy' (*Hydrocleys nymphoides*). The Water Corporation had initially suspected it to be Amazon frogbit (*Limnobium laevigatum*) which is the reason SERCUL was informed about it in the first place.

At the time, Water Corporation did chemical and physical weed control to clear the completely congested drainage line (Figure 2). However, some isolated plants were later found in the Wungong Brook and the weed species was not completely removed from Wungong or fully mapped.

When the plant specimen was identified it was sterile, and identification was done on morphological characters. SERCUL's field visits in April 2019 observed the weed species still growing in the drain. In April, we were able to collect some specimens with flowers (Figures 3, 4, 5 and 6). The fertile specimens were handed over to a senior taxonomist, Dr Pali Jayasekara, for detailed investigation. He identified the weed species as Kidneyleaf mud plantain (*Heteranthera reniformis*), not the 'Water

Poppy' (*Hydrocleys nymphoides*). The herbarium of Western Australia does not have specimens or records of this weed species and this is the first report of *Heteranthera reniformis*. Dr Jayasekara further confirmed the identification with the National Herbarium of New South Wales. SERCUL has commenced research on *H. reniformis* and visited 12 major aquarium and pond shops in the Perth region to determine if they are selling this new weed, fortunately with no results (Table 1).

### ***Heteranthera reniformis* (Kidneyleaf mud-plantain)**

#### **Background:**

*Heteranthera reniformis* belongs to the water hyacinth (*Eichhornia crassipes*) family Pontederiaceae. It is superficially similar to water hyacinths when not in flower, but water hyacinths have swollen leaf stalks, and much larger flowers. This plant is commonly known as the Kidneyleaf mud plantain, sometime called 'water bean' or 'floating leaf mud plantain'. *H. reniformis* is primarily a species of the American tropics, native to the fresh water wetlands of North, Central, and South America (Arakaki, D., 2013; Csurhes, S., 2016).

This species has naturalised in Italy, Spain and outside of its native range in the USA. The Kidneyleaf mud plantain is a significant rice weed in Latin America and a number of European countries, particularly in Italy, where it can cause the yield to be reduced by up to 70% (Csurhes, S., 2016; NSW WeedWise; Randhawa, R., 2017).

According to the NSW and Queensland governments, the Kidneyleaf mud plantain was introduced to Australia as an ornamental pond plant, and has been actively promoted on a number of Australian websites. The first reported naturalised population was found in northern Sydney in February 2006. Then in late 2007, another population was located in coastal South East Queensland. Soon after, more than 20 additional sites were found in South East Queensland. Currently, the Kidneyleaf mud plantain has naturalised in some regions of New South Wales and Queensland (Business Queensland, 2016; NSW Flora online).

Similar to most other invasive aquatic species, ornamental trade in the aquarium and pond markets have no doubt resulted in its escape and naturalisation. We noticed that the Kidneyleaf mud plantain is a popular ornamental pond plant and is actively promoted on internet sites for its attractive foliage. Online websites comment that this plant is 'well suited' or 'very attractive,' and is 'excellent for use in small ponds and water gardens'.

The Kidneyleaf mud plantain is a declared, prohibited plant in all regions of New South Wales. In Queensland, it is not a prohibited or restricted invasive plant. However, their local governments have a biosecurity plan that covers invasive plants and animals in these areas. This plan may include actions to be taken on certain species. A detailed risk assessment report of tradable aquatic plants in

Australia was done in June 2008 by NIWA with the National team (NIWA 2008). The Kidneyleaf mud plantain was included in the top 33 priority species that were recommended for a national ban on sale and distribution in Australia.

### **Habit and Habitats:**

The Kidneyleaf mud plantain is an annual or perennial, submerged or floating plant that grows 15-20 cm tall in fresh water less than 15 cm deep and on damp soil at water's edge. The stems can grow along the mud under the water, with leaves and stems emerging. Roots occur at nodes along the stems (NSW WeedWise; Csurhes, S., 2016).

The plant prefers open, sunny sites with nutrient rich soils. It will quickly colonise open sunny areas but does not grow well in shaded areas, or amongst taller growing vegetation such as sedges and tall grasses. It is most commonly found along roadside ditches, streams, ponds, drains, freshwater tidal mudflats, and riverbeds (Business Queensland, 2016; Csurhes, S., 2016; NSW Weed wise; Randhawa, R., 2017). Since its stems can produce roots at each node, any broken segments with more than one node can be washed downstream to infest new areas.

### **Key identification features (NSW WeedWise):**

- Leaves are kidney-shaped, bright green, and glossy, up to 5 cm wide and arranged alternately along the stem. They are attached to a fleshy stalk (petiole) 2–13 cm long and are either floating or emerging above the water. Occasionally, a cluster of basal leaves may occur without a stalk.
- Flowering stems are a spike 1–9 cm long containing 2–8 flowers. Each flower has six white-to-pale blue petals. Flowers open a few hours after sunrise, wilting by early afternoon. Flowering occurs during summer and autumn in temperate to subtropical areas, and all year in the tropics.
- Fruits are capsules 0.5–0.9 mm long and contain 8–14 winged seeds.

### **Dispersal:**

The Kidneyleaf mud plantain reproduces both from seed and vegetative fragmentation. The plant mainly disperses by vegetative reproduction. Any stem fragment with a node is capable of producing a new plant. Stem fragments can be washed downstream or moved to a new location in mud stuck to shoes, animals or vehicles.

Seeds are winged and small, allowing them to be dispersed by wind and water. Seeds can persist in the soil for many years.

### **Summary:**

The Kidneyleaf mud plantain has only recently been discovered in the Perth Region, and little is known about what impacts it could have in our waterways. Detailed investigation is necessary to

understand its distribution and relationship with our local environmental conditions. However, its history as a pest elsewhere is perhaps the most robust indicator of pest potential. According to Sydney, Queensland, and international information, this weed has the potential to become an abundant and troublesome pest in the Perth Region, by forming dense mats within storm water systems and shallow freshwater wetland habitats. This fast growing anchored aquatic weed can quickly invade any shallow water systems, obstructing drainage networks or stream flow, and threatening the stormwater infrastructure. The weed species can form dense mats that choke native aquatic plants and impact the wetland ecosystem and food webs. It also could provide a good habitat for mosquitoes, increase vector mosquito populations and the mosquito borne disease risk.

This weed is reported as a global rice weed and has already proved to be an economically problematic species in many countries. Since it can cover shallow water surfaces, it is likely to interfere with water supply to irrigation fed agricultural areas in Western Australia.

If the Kidneyleaf mud plantain spreads in Western Australia, not only can it impact both environmental and human health it also can cause economic impacts.

Based on our observation at the Champion Drive main drain, the Kidneyleaf mud plantain is growing very well in the Perth environment. As such, there does not appear to be any climatic limitations to its growth in Western Australia. We have nutrient contaminated drainage ditches and shallow, disturbed, freshwater wetland habitats in the Perth Region for this species. The Kidneyleaf mud plantain has successfully naturalised in several areas of Queensland and New South Wales, where it appears to dominate other native wetland vegetation, as well as stormwater drainage lines.

Our recent investigation identified this plant is not being sold in any aquarium or pond shops in the Perth Region (see Table 1 for Aquarium/Pond shops visited). However, it is a popular ornamental pond plant and is actively promoted and sold in some states' aquarium trade for its attractive foliage, which has the potential to escape and spread in Western Australia. There is possibility of accidental introduction into waterways or negligent dumping of garden waste and this could spread downstream during floods. Seeds and plant fragments may also be dispersed in mud that becomes attached to animals and vehicles.

It is dangerous because of its quick growth, mat-forming habit, and its ability to out-compete native vegetation; it has the potential to be a serious weed.

For control measures, physical control is the main option mentioned in most studies. Strict hygiene protocols will have to be implemented and followed as this species can easily spread through fragmentation. As this species is new, no specific chemicals are currently registered for its control in Australia (Weed Watch –Technigro, 2010). However, as it is an environmental weed, APVMA off-



label permit 11463 is applicable (Australian Government, APVMA). The added disturbance will encourage seed strike; hence follow-up treatment will be required.



Figure 1. Location of the first reported population of new aquatic weed.



Figure 2. Infestation of the new aquatic weed (now identified as Kidneyleaf mud plantain) in Champion Drive main drain, May 2018. (Photo: Dan Friesen, SERCUL).



Figure 3. Floating leaves and spreading underwater stems with roots. (Photo: Dan Friesen, SERCUL).



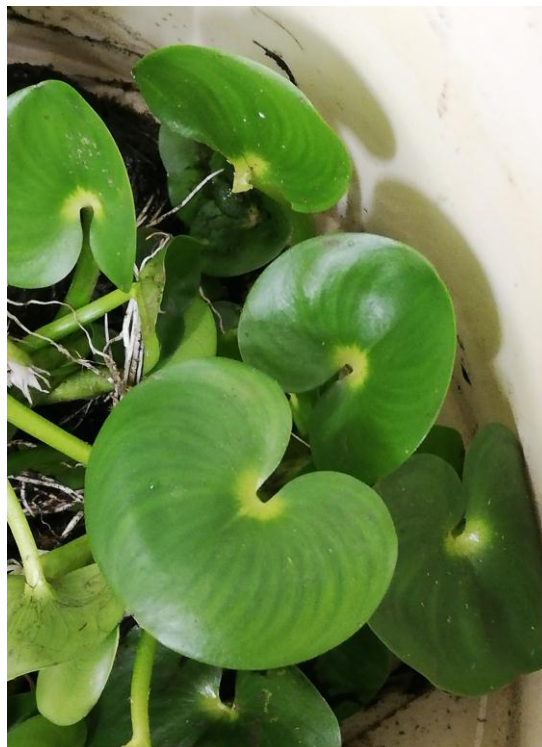


Figure 4 & 5. Kidneyleaf mud plantain delicate flowers and close-up of kidney-shaped leaves.  
(Photos: Rose Weerasinghe, SERCUL)



Figure 6. Roots occur at each node (Photo: Rose Weerasinghe, SERCUL)



Figure 7. Regrowth of the weed in April 2019 (Photo: Rose Weerasinghe, SERCUL)

Table 1. List of Aquariums and pond shops visited in the Perth Region.

Name and the Location	Indication of selling Kidneyleaf mud plantain
Aquotix Aquariums, Canning Vale	No
Aquarium Gallery Perth, Wangara	No
Avid Aquaria, Kelmscott	No
Equaria Fish & Pet Store, Gosnells	No
Better Pets & Gardens, Wangara	No
GoTropo Aquariums, Wangara	No
Living Ponds, East Victoria Park	No
Pet Magic, Cannington	No
Rob's Aquarium, Malaga	No
Swan Valley Fish & Lily Farm, Baskerville	No



The Pond Shop, Midvale	No
Woodvale Fish & Lily Farm, Woodvale	No

## References:

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Australian Government, Australian Pesticides and Veterinary Medicine Authority (APVMA), PER11463. Accessed online: <http://permits.apvma.gov.au/PER11463.PDF>

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