



Biddip

Newsletter of the Toodyay Friends of the River

Volume 2, Issue 2

Bridal Creeper Rust Fungus has a foothold in Toodyay

Bridal Creeper (*Asparagus asparagoides*), a declared Weed of National Significance in Australia (WONS), has been continuing to spread throughout the Shire of Toodyay, particularly along the Avon River. The **Friends** of the River have been attempting to control it for a number of years. In 1999, the Bridal Creeper Leaf Hopper was released, but this didn't prove successful.

Early in 2002, the Rust Fungus *Puccinia myrsiphylli*, was released at two sites, one behind the town and one at West Toodyay.

We are delighted to report that, following the analysis

of some samples from West Toodyay, it has been confirmed that the pathogen was the cause of the plants leaves discolouring. The fungus absorbs nutrients and water from the plants leaves and stems, reducing development and reproduction, thereby reducing stem, fruit, rhizome and tuber production. The fungus also destroys leaf tissue by producing fruiting bodies, thus reducing the photosynthetic surface of the plant.

In the first instance, it is expected that the rust will considerably reduce the number of fruits in a season, which will slow down fur-

ther spread of the weed. High levels of infection of above-ground biomass over several years is expected to deplete underground reserves, stored in the extensive tuber mat, thus reducing the competitiveness of the weed.

The **Friends** wish to acknowledge the work done by CSIRO Weed Management Systems, and particularly Kathryn Batchelor for her assistance on the project, and for the technical data on the fungus.

Details on the rust fungus can be found on the CSIRO Website at:

www.ento.csiro.au/bridalcreeper

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Special points of interest:

- An article from 1976 calls the Avon "a dying river"
- *Acid Sulphate Soils* - what do we know of them and what are their consequences.

The Avon: Faunal and other notes on a dying river in South-Western Western Australia

By George W. Kendrick

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Part One of a Series

April 14, 1976

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Introduction

In the course of general studies on the freshwater molluscs of Western Australia, it became apparent that very little information was available, either in museum collections or published records, about the mollusc fauna of the Avon River. This was unexpected because the Avon is one of the major rivers in the South-West Region and could have been expected to contribute prominently to any study of the aquatic life of the area. In seeking to account for this

discrepancy, evidence has been obtained which suggests that, since the turn of the century, the original aquatic environment and fauna of the Avon have been subjected to a variety of disturbances of increasing severity. These, so far as they affect the molluscs, have reached catastrophic proportions and local extinction now seems distinctly possible for some, if not all, of the original fauna. Paradoxically, the environmental changes that have harmed these species have facilitated upstream expansion into the Avon of what appears until recently to have been a wholly estuarine mollusc. The reason for these changes seems to lie with the near-complete alienation of land for agriculture in the drainage basin and the absence of any kind of conservation-

management policy that would recognise the need to protect the riverine environment and biota.

The inland boundary of the Avon drainage basin is not readily definable, varying according to the seasonal fluctuations in the amount and distribution of rainfall. Theoretical maximum boundaries are depicted by Bettenay and Mulcahy (1972: 360, Fig. 1), who recognise a topographically young to mature western part, characterised by a regular, annual discharge to the sea and a larger, topographically old inland part, which contributes to external drainage only irregularly and after periods of exceptional rain. In most years, external discharge is confined to the area westward

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Discovering the past

On Sunday 15 December 2002, members of the **Friends** met in Duidgee Park, then followed Gaven Donegan in convoy down to Cobbler Pool.

After collecting a pile of rubbish left over from the last Avon Descent, Gaven gave members an insight into Cobbler Pool, and his

connection with it, including a number of humorous anecdotes. He also voiced his concerns about the changes that had happened since the Avon Descent, including the removal of trees and damage to the banks.

Gaven then led members upstream, looking at various features around the top end

of Cobbler Pool, and on to Duck Pool.

After exploring this section of river, members then drove further downstream, past Coombawongi Crossing, to Rocky Basin Pool.

It is hoped that, in the near future, Gaven's stories will be recorded for posterity.

Lloyd Reserve Opened by Minister

by Wayne Clarke

In a ceremony at Lloyd Reserve on 31st May 2003, the Minister for the Environment and Heritage, Dr Judy Edwards, officially accepted Lloyd Reserve from the Lloyd Family on behalf of the People of Western Australia. A large number of people were present at the ceremony, with representatives from the Friends of the River, River Recovery Teams, the Toodyay and Northam Shires, officers

from the Department of Environment and consultant, Viv Read.

At the same time, the Minister Launched River Recovery Plans for Sections 1&2, 4&5 and 7&8 of the Avon River Recovery Programme. Sections 1, 2 and 4 are within the Shire of Toodyay, and complete the River Recovery Plans for the River through Toodyay.

The Department of Environment provided morning

tea, and those attending had an opportunity to speak to the Minister following the ceremony.

The *Friends* of the River have now signed a Management Agreement with the Department of Environment for the ongoing management of Lloyd Reserve, and the Seed Orchard Group (a subgroup of the Toodyay Naturalists Club) have already begun an Envirofund project in the reserve.



The Minister for the Environment and Heritage, Dr Judy Edwards, officially accepting Lloyd Reserve.



l to r: Minister Edwards, Wayne Clarke, Denis, Murray and Oriel Lloyd after the ceremony.

Turtles in the Avon

by Desraé Clarke

The Long-necked Turtle is found only in the southwest of Western Australia, and there are several known populations on waterways in Toodyay. Its carapace (shell) is elliptical, and can grow to a length of 40cm; it's the turtle's protection, as it can pull its neck and legs beneath it.

When swimming, the Long-necked turtle submerges, allowing only the snout and eyes to be visible; it can resemble a small twig floating

in the water. Although extremely shy, it may be found sunbaking on a partly submerged rock or log; however, the slightest disturbance will cause it to quickly slip back into the water.

The female lays about 25 brittle-shelled eggs in the riverbank, or she may travel long distances across paddocks or roads to find a suitable habitat. Foxes often dig up their eggs and eat them.

When the young turtles break

through the shell, the journey back to water is fraught with danger, with predation from birds as well as foxes and cats.

The Long-necked Turtle is carnivorous (meat eating), feeding on fish, other aquatic creatures and earthworms. There are some very large specimens to be found in the Avon River, and a very old creature has been seen a number of times in the vicinity Lloyd Reserve.

Natural Resource Management in the Avon Region *by Bethan Lloyd*

Regional Strategy

The Avon Catchment Council (ACC) has been recognised by both the Commonwealth and State Governments as the lead natural resource management (NRM) body for the Avon River Basin, and has been set the task of developing an accredited NRM Strategy for the region. It is intended that the Strategy is delivered to Canberra for accreditation by the end of the year.

Alongside the NRM Strategy will be an Investment Strategy through which all future Commonwealth and State funding for NRM projects will flow.

The Strategy development is a major undertaking, and the Council has contracted a number of consultants to assist it to complete the various tasks involved. It is essential that the Strategy is community owned, and Focus Group meetings have been held throughout the Basin to ensure community input into the Strategy's development. Two meetings have been held here in Toodyay, with valued input from the local community.

During October, there will be a number of Regional Fo-

cus Group meetings to review the local group findings, and to finalise the community consultation process.

Local Coordinator funding

Once again, through the Avon Catchment Council, the Toodyay Land Conservation District Committee (LCDC) has procured funding from the Natural Heritage Trust for part of the salary for a local coordinator. \$11,000 has been

Avon Catchment Council is to develop an Accredited Natural Resource Management Strategy for the region

received for this project, and will supplement the funds received by the Service Charge for the Community Landcare Support Officer (CLSO).

In procuring this funding, the CLSO will be required to complete a number of obligations related to the accreditation of the regional NRM Strategy. However, these tasks will still be related to those originally agreed under the Service Charge.

Lloyd Reserve Envirofunds

The Seed Orchard Group was successful in receiving fund-

ing from the Commonwealth Governments *Envirofund* programme, to set up a demonstration site to try different methods of weed control and revegetation at Lloyd Reserve. The aim is to illustrate the different ways in which land managers can tackle these problems in similar areas.

The group intends to establish a seed farm in the reserve, as a community resource, to assist with future revegetation projects within the Shire of Toodyay.



Lloyd Reserve ripped ready for the Seed Orchard Project.

Contacting the Avon Catchment Council

The Avon Catchment Council is located with the Department of Agriculture in Northam. To contact them, telephone 9690 2250, or you can visit them on their Website at:

www.avonicm.org.au

**Visit the Avon Catchment Council on the web at:
www.avonicm.org.au**

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from the Meckering Line of Mulcahy (1967, 1973). The present study concerns mainly the active, fully fluvial part of the Avon lying immediately inland from the Darling Range and major tributaries, such as the Dale and Mortlock Rivers, the Talbot and Spencer's Brooks (Fig. 1). Most of this area lies between the 380-508mm (15-20 inch) isohyets, the wettest months being May to October. River flow is strongly seasonal and usually ceases during summer-autumn.

1. *The Avon Molluscs*

Aquatic molluscs were recorded from the Avon soon after the establishment of the Swan River Colony. The collector J.A.L. Preiss (see Glauert, 1948) obtained two species, a thiarid snail and a naiad or freshwater mussel while in the York district between 1838-42. His specimens were presented to C.T. Menke, the German conchologist, and recorded (Menke, 1843) under the names *Melania lirata*, new species and *Unio australis* Lamarck respectively. However the names applied by Menke to these particular specimens are no longer recognised. The first was a homonym of *M. lirata* Benson and was replaced by

Brot (1862) with the new name *Melania incerta*. Later, Australian snails of this group have been placed in the genus *Plotiopsis* Brot. Their taxonomy is unsatisfactory (see McMichael, 1967) and the correct name for the Avon specimens is uncertain but I follow Hedley (1916) provisionally, in the use of the name *P. australis* (I. and H.C. Lea, 1850) for Western Australian occurrences. Menke's other name was a misidentification of the species now known as *Westralunio carteri* Iredale (see McMichael and Hiscock, 1958). The present whereabouts of Menke's specimens is unknown; they may be lost (Dance, 1966).

A second early record from the Avon concerns a specimen of *W. carteri* presented to the British Museum (Natural History) by Mrs. J. Gould (McMichael and Hiscock, *ibid*), which was probably collected by John Gilbert while in the York or Toodyay districts during 1839-1840. Whittell (1954) records that Gilbert's consignments to Gould in the latter year, at the close of his first visit to Western Australia, included three boxes of shells.

These few records from the pioneering days of the last century (with the sole exception of Main, 1968: 58) appear to comprise all that has been published hitherto on the mollusc fauna of the Avon. Recent

collecting has revealed the presence of a further 5 species, making a total of 7 species from the river. These 7 are the bivalves *Westralunio carteri* Iredale and *Anticorbula amara* (Laseron), the prosobranch snails *Potamopyrgus* sp., *Coxiella glabra* Macpherson and *Plotiopsis australis* (I. and H.C. Lea) and the pulmonate snails *Physa* sp. And *Physastra* sp. The status of these species, past and present, is discussed separately.

[A full and comprehensive discussion on the 8 molluscs is presented in the Journal. However, as the condition of the river is the main interest of this article, the descriptions will be left until a later edition of 'Biddip']

2. *The condition of the Avon*

(a) *The Avon as it was*

The first Europeans to sight the Avon River did so in August 1830 near the impending site of York. The weather was wintry and the river in flood. The leader, Ensign Robert Dale, recorded in his journal (Dale, 1833a) that "The water was discoloured and muddy with a rapid current and enclosed between banks moderately clothed with trees and shrubs". No other reference

With the current proposal by the Wheatbelt Channel Steering Committee to open up a 35 kilometre-long drain into the Yenyenning Lakes, the question of what affect hyper-saline water and acid sulphate soils will have on the Avon and Swan River systems needs to be asked.

The Wheatbelt is well known for having hyper-saline waters, sometimes up to ten times the salt level of sea water. But the question of acid sulphate soils has not arisen until just recently.

What are acid sulphate soils?

Acid Sulphate Soils (ASS) contain iron sulphides. If these soils are exposed to the air, they oxidise to form sulphuric acid (hence the name ASS). There are significant environmental problems associated with ASS, particularly to agricultural enterprises of the Avon Wheatbelt, where broad flat valleys of low gradient, salt lake chains and areas of deeply incised valley floors characterise much of the landscape.

Iron sulphides are usually contained in layers of waterlogged soil. These layers of either clay or sand are usually dark grey and soft. While they are waterlogged, oxygen in the air is not able to react with the iron sulphides in the soil. Exposed ASS are generally mottled yellow in colour. The soil it-

self can neutralise some of the sulphuric acid, while the rest of the acid moves through the soil, acidifying soil water, ground water and eventually surface waters.

As the sulphuric acid moves through the soil, it strips iron, aluminium and sometimes manganese from the soil. In some cases it also dissolves heavy metals such as cadmium. There are not many plants that can survive this toxic mixture. Can you imagine the effect it would have on fish, the crustaceans, and the macro-invertebrate fauna of our river systems?

Drainage can speed the formation of ASS, by exposing the iron sulphides to the air. As a consequence, large slugs of acid groundwater are released rapidly into the waterways, and the concentrated acid can overwhelm the stream's capacity to neutralise it.

The first rains can wash substantial quantities of sulphuric acid into waterways, effecting entire aquatic ecosystems including plants, fish, crustaceans and other organisms.

Management

The best way to manage ASS is to avoid disturbing or draining iron sulphides. If it is uncovered accidentally, then re-covering it immediately may prevent it from forming ASS.

How can we recognise ASS

It is important to be able to recognise ASS, and the following are warning indicators:

- Cloudy blue-green water
- Excessively clear water
- Iron stains
- Poor pasture
- Scalded soil
- Yellow mottled soils

Wide shallow drains allow surface water to drain quickly, and if these are grassed then they have the added benefit of erosion prevention.

Treatment of ASS

There has been a significant amount of effort put into finding treatment methods for ASS. The options, however, become more limited where the water is very salty, as in the case of the Avon Wheatbelt. Treatment costs will be extremely high, and consist of passing the ASS through ponds lined with limestone (passive treatment), or the addition of a neutralisation agent and then the acidity allowed to fall out in a settling pond (active treatment).

Both methods need a number of treatment ponds to be constructed, and both require full-time operators to manage the systems.

The treatments described require continual monitoring, and there are other considerations with drainage (such as increases in sodic soils leading to drain wall collapse, and erosion) that need to be

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was made to water quality. A later report (Dale 1833b) refers to brackish and salt water pools in the upper reaches of the Avon during October. Pools of varying salinity, from fresh to salt, along the Avon in 1836 are referred to by Bunbury (1930: 28, 32, 43, 50).

The central Avon valley was one of the earliest districts to attract settlers from Perth. The first of these “set out in September 1831 to take possession of their grants. Soon all the river frontages from the present towns of Beverley to Northam were taken up...” (Mouritz, 1956: 46). Private land extended “right into the river bed”, according to James (1893), a condition that generally prevails to this day. Early reports on the Avon lack chemical data but suggest that, even in the early years of European settlement, water quality varied perceptibly with time and place but

this did not prevent it being used extensively by the settlers. Describing the Avon at Toodyay in the 1870’s, Hammond (1936: 123) recalled that “The very fine pools of fresh water in the river in the summer time made the whole district suitable for raising stock of all kinds”.

In a report to Parliament on water supplies along the Avon, James (1893) found the river water at York to be unsuitable for domestic purposes, particularly when in flood, because of overflow (presumably saline) water from lakes near the river’s source; however a western tributary near York was found to have “remarkably pure water”. At the Mortlock confluence just below Northam, James noted that the Avon became saline and undrinkable. However water in pools by Mt. Noondening (near “Glen Avon”, between Northam and Toodyay) was “fairly good, having a slightly

sweet taste, quite suitable for house or stock purposes”. Burlong Pool was then “a vast sheet of water fully one third of a mile long. The river at this point has well defined, fairly high banks; this pool is now running full and water is of excellent quality, quite suitable for domestic purposes, although it carries with it at this date (March 1893) a slight taste”.

This article will be continued in the next edition of 'Biddip'. There are some very interesting facts about our river to follow, including "The Avon Turns Salt", "Livestock Pollution", "A River of Sand", and "Wanted: A new approach". One of the contributors to the article was the late Jim Masters, a foundation member of the 'Friends'.

The original WA Naturalist Journal with this article is still available from the WA Naturalists Club. Email address for the Club is: wanats@iinet.net.au

Acid Sulphate Soils(cont).

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taken on board.

A more realistic approach is to develop individual projects for each property or small sub-catchment. The latter could be a good means of helping to defray some of the huge costs involved in treating ASS.

Who pays?

Unless there is a significant **public** asset at risk, the public could not be expected to pay for the treatment of Acid Sulphate Soils.

There will be much discussion on the subject of drainage in the next year or two. The Departments of Environment and Agriculture are working closely together on

projects that will see a more cooperative approach to regional water management that will consider all of the down-stream consequences.

For more information on Acid Sulphate Soils, visit the NSW Department of Agriculture website on: <http://www.agric.nsw.gov.au/reader/soil-acidss/acid-intro.htm> Article compiled from data supplied by NSW Department of Agriculture.

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“Make Friends with
our Avon River”



The objects of the Toodyay Friends of the River are to work towards the conservation and rehabilitation of the Avon River and its environs. In the bigger picture of natural resource management, we are committed to implementing the Avon River Management Program and its associated River Recovery Plans for each of the four sections of river that pass through Toodyay.

Toodyay Friends of the River

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Cobbler Pool clean-up



Minister at Lloyd Reserve

S n a p s h o t s



Re-growth along the river in Toodyay



Opening of Lloyd Reserve