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POISON PLANTS OF WESTERN AUSTRALIA

CHAMPION BAY POISON

SANDPLAIN POISON

CLUSTER POISON

HUTT RIVER POISON

GILBERNINE POISON



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POISON PLANTS OF WESTERN AUSTRALIA

The toxic species of the genera
Gastrolobium and *Oxylobium*

CHAMPION BAY POISON (*Gastrolobium oxylobioides* Benth.)

SANDPLAIN POISON (*Gastrolobium microcarpum* Meissn.)

CLUSTER POISON (*Gastrolobium bennettsianum* C. A. Gardn.)

HUTT RIVER POISON (*Gastrolobium propinquum* C. A. Gardn.)

GILBERNINE POISON (*Gastrolobium rotundifolium* Meissn.)

By T. E. H. APLIN, B.Sc., Botanist

THIS article deals with five species of the genus **Gastrolobium**. The plants look rather similar so in the past have often been confused. They occur over a considerable area of the agricultural region of Western Australia.

CHAMPION BAY POISON

CHAMPION BAY POISON is found on gravelly soils and red loams from the Murchison River, through the West Midlands area, to the foothills of the Darling Range near Kalamunda. In the West Midlands area it is commonly associated with sandplain vegetation on gravelly rises and with patches of wandoo woodland.

Champion Bay poison is a small shrub rarely more than two feet high, with several stems arising from a short woody stock. The leaves, usually arranged in whorls of three, are narrow-elliptical to narrow-lanceolate with a fine rigid point at the apex.

The leaves taper somewhat abruptly at the apex and more gradually towards the

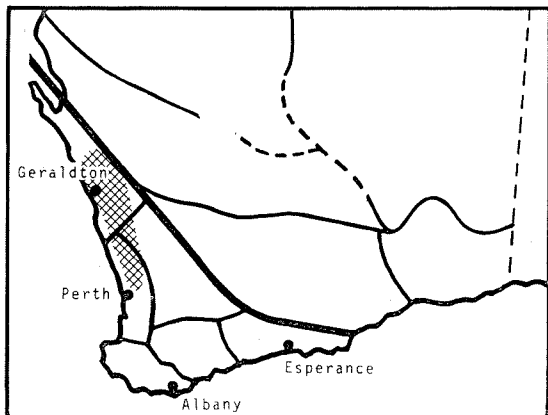
base. The thick conspicuous midrib and the slender leaf-stalk often continue down the stem for a short distance below the point of attachment giving the stem at the point of attachment of the leaf an angular outline when cut in transverse section. The leaf is concave above or rarely flat, the blade or lamina is prominently and closely veined and is pale green or grey-green both on the upper and lower surfaces. The stipules are long and hair-like.

The few flowers are borne in clusters of three, on an elongated raceme. They are relatively large. The corolla is yellow, tinged with red. The calyx is attached to the axis of the raceme by a short pedicel or stalk. Both the pedicel and the calyx are covered by a whitish, silky, flattened

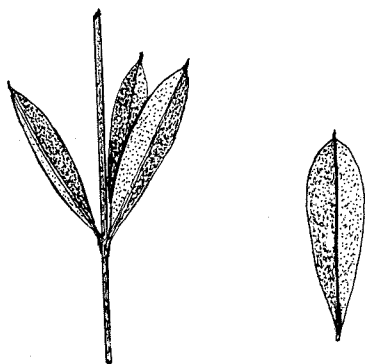


CHAMPION BAY POISON

Champion Bay poison, *Gastrolobium oxylobioides* Benth., is one of the most important and most toxic of plant species found in the West Midlands region. Its range of distribution extends from the Murchison River southwards to the foothills of the Darling Range near Kalamunda.



Distribution of Champion Bay poison



Leaves of Champion Bay poison

coating of hairs. The ovary bears dense, silky hair and is borne on a stalk.

The plant resembles the genus *Oxylobium*, as the specific name implies.

In the West Midlands is found one of the so called "mock poisons," *Gastrolobium obovatum* Benth., which closely resembles Champion Bay poison but is not toxic to stock. Mock poison has its flowers arranged in clusters in the axils of the leaves whereas Champion Bay poison has its flowers borne in racemes which arise terminally.

In the absence of flowers mock poison may be identified by its leaves, which are more often borne in pairs (sometimes in threes) as against Champion Bay poison which normally has its leaves in whorls of three.

The stems of mock poison are normally circular in transverse section throughout its length, whereas the stems of Champion

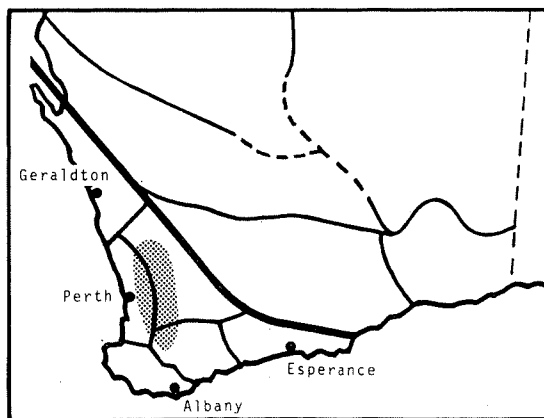
Bay poison are usually triangular in transverse section just below each leaf whorl, due to the continuance of the leaf stalk along the stem. The stems of mock poison often have a velvety covering while the stems of Champion Bay poison are smooth.

SANDPLAIN POISON

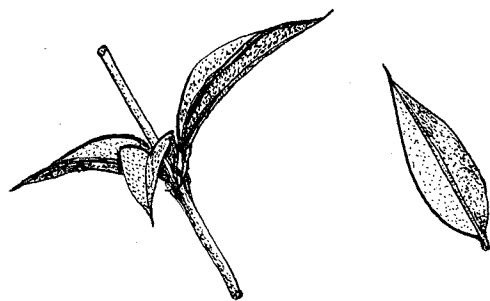
SANDPLAIN POISON, which in the past has been confused with Champion Bay poison, is an erect shrub some three to four feet high with stiff spreading erect branches. Despite its common name, this plant is generally associated with wandoo woodland in the eastern part of the Darling Range. It is found from Wannamal in the north, to Narrogin in the south. It is extremely prevalent in the State Forests to the north-west of Narrogin, in the vicinity of Dryandra.

The leaves of sandplain poison are borne in whorls of three along the stem and are spread at a wide, almost horizontal angle. They are flat or undulate, often curved backwards, elliptical, and tapering towards both ends. The apex tapers into a sharp point. The upper surface of the leaf blade is olive green, the under surface is paler with a few silky hairs particularly on the midrib.

The flowers are borne in threes on long racemes that arise terminally or from the upper leaf axils. The inflorescence stalk, the pedicels or individual flower stalks and the calyces are clothed with silky spreading hairs. The flowers are much smaller than those of Champion Bay poison.



Distribution of sandplain poison



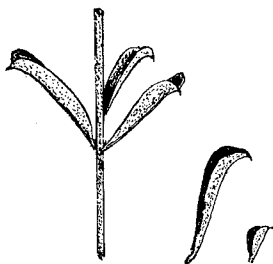
Leaves of sandplain poison

The specific name, *microcarpum*, is derived from the Greek and means "small fruit"; the fruit is small in comparison with other species of the genus *Gastrolobium*.

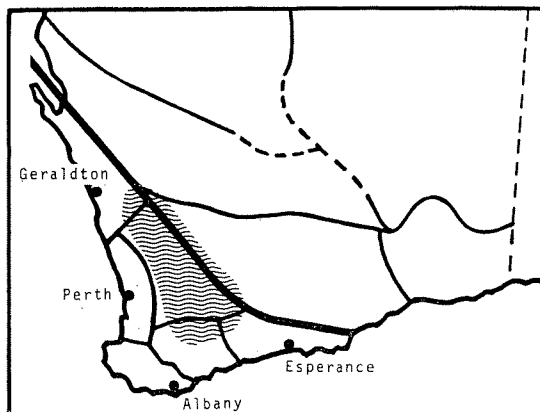
CLUSTER POISON

CLUSTER POISON, described in 1942, was named after Dr. H. W. Bennetts, a veterinary pathologist, who collaborated with the botanist author of the species, Mr. C. A. Gardner, in toxic plant investigations. This plant had in the past been confused with Champion Bay poison and sandplain poison.

Cluster poison is a thickly branched shrub, from four to six feet high and also about four to six feet wide, when growing in thickets on gravelly soils. In open sandplain country the plant is much smaller, with broader, blue-green leaves, rather than narrow, yellow-green leaves. It is associated with sandplain vegetation and more particularly with tamma, wodjil and native cypress pine. Cluster poison is found from Arrino eastwards to Wialki, Merredin and Carrabin. At the southern part of its range, it extends from Kukerin eastwards to Holt Rock.



Leaves of cluster poison



Distribution of cluster poison

The leaves of cluster poison are usually borne on the stem in whorls of three. They are erect, longitudinally folded and keeled, broadest above the middle and abruptly taper into a rigid point at the apex. The leaf is somewhat turned outwards in the shape of a bow. The length of the leaf can vary quite considerably. Plants with shorter leaves are found at the southern end of the distribution range. The stipules are small and bristle-like and usually break off.

The flowers are arranged in threes in dense terminal racemes which extend beyond the leaves. The common name cluster poison refers to these terminal clusters of flowers. The axis of the raceme and the pedicels are clothed with short, smooth, downy hairs. The calyx is almost hairless. The lobes of the calyx are short and broad, with the upper two being more united than the lower three. The ovary and the young seed pod are densely silky-hairy. The flower buds are concealed by chestnut coloured hairless bracts which closely overlap.

HUTT RIVER POISON

HUTT RIVER POISON, named after the locality where it is commonly found, was described in 1955. Before this it had been confused with Champion Bay poison which it closely resembles when not in flower. Its specific name is derived from the Latin *propinquus*, which means near or closely connected with. This referred to its close affinity with Champion Bay poison.



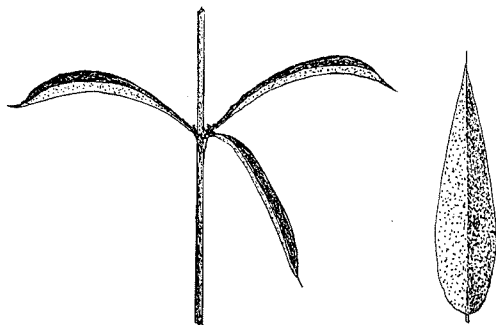
SANDPLAIN POISON

Sandplain poison, *Gastrolobium microcarpum* Meissn., is generally associated with wandoo woodlands on the edge of the Darling Range. It is found from Wannamal southwards to Narrogin.



CLUSTER POISON

Cluster poison, *Gastrolobium bennettianum* C. A. Gardn., is widely distributed in the wheatbelt. It has a dense spike of flowers, hence its common name, whilst its leaves vary in length and shape from north to south, the southern forms having very much shorter leaves.

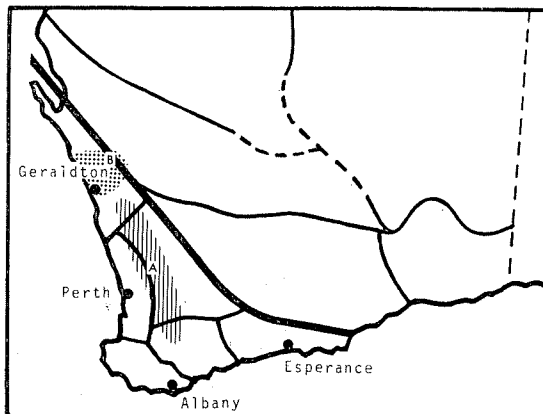


Leaves of the Hutt River poison

Hutt River poison is a taller shrub than Champion Bay poison, up to 4 feet high, branched, and with smaller and more numerous flowers. It is found along the Hutt River, at White Peak and Isseka and to the southeast of Geraldton, east of Walkaway. The leaves vary from bluish green to olive green. Another plant found in rough country to the north of Mullewa, has longer olive green leaves which do not taper towards the base and grows into a much larger shrub than the true Hutt River poison. It has been placed in the same species as Hutt River poison.

Hutt River poison is a shrub with whorled, erect or spreading branches and a dark coloured bark. The branchlets are angled, the angles being formed by the continuance of the leaf-stalk along the stem. The leaves are mostly in whorls of three. They are from one and a half to two inches long, narrowly lanceolate, and folded along their length. The leaves gradually taper towards both shoot and apex, with a fine sharp point at the apex. The leaves are often curved backwards in the shape of a bow as in cluster poison and sandplain poison. The plant found north of Mullewa has leaves which are more flattened, two to two and a half inches long and rounded rather than tapering at the base. The stipules are fine and black, but disappear as the leaf matures. The colour of the leaves vary from blue-green to olive-green.

The flowers of Hutt River poison, which are smaller than those of Champion Bay poison, are borne on long slender racemes, much longer than the leaves, which are mostly terminal although also present in the upper leaf axis. The calyx is sparsely



Distribution of—(A) gilbernine poison; (B) Hutt River poison

hairy with white, appressed hairs. The corolla is orange-yellow in colour. The acute, entire, chestnut-brown bracts which conceal the flower buds are larger than those on Champion Bay poison.

GILBERNINE POISON

GILBERNINE POISON is an erect bushy shrub one to two feet high with many erect branches arising from a thick woody stock. In the past this species has been confused with Champion Bay poison. Gilbernine poison is usually found on heavy clay soils from near Mingenew southwards to Wagin. It is normally associated with wandoo woodland.

The branches and young leaves of Gilbernine poison are usually hairy. The mature leaves are dark green and shiny above, paler underneath. The leaves are oval shaped and end in a fine sharp point at the apex. The typical form has leaves



Leaves of gilbernine poison



HUTT RIVER POISON

Hutt River poison, *Gastrolobium propinquum* C. A. Gardn., although limited in distribution it exhibits considerable variation. The form illustrated above is found in the Walkaway district, southeast of Geraldton.



HUTT RIVER POISON

The form of Hutt River poison illustrated above is found in rough breakaway country north of Mullewa. This form has longer leaves, rounded rather than tapered at the base, and can grow into a large shrub up to 10 feet high.

that are flat or undulate. A narrower-leaved form, the variety *angustifolium*, found in the Miling district, possess leaves that have their margins rolled inwards underneath. The leaves in this form are longer and due to the inrolling of the margins appear to be very much narrower than the typical form. The stipules are erect, long and pointed with broad membranous margins towards the base. The specific name, derived from the Latin, means round leaf and refers to the outline of the leaf of the typical form.

The flowers are borne in a relatively dense raceme. The axis of the raceme with the pedicels and the calyces are clothed with white hairs. The ovary is also densely hairy. The bracts which persist until the flowers open are large, and chestnut-brown in colour.

TOXICITY

Reports of stock losses suffered in the Guildford district in 1837 (or even earlier) could well have been due to Champion Bay poison. In May, 1841, to settle disputes regarding the toxicity of certain leguminous plants, the Agricultural Society decided to conduct official tests at Guildford, in the presence of many local dignitaries. It is almost certain that the plants used in the experiments were Champion Bay poison. Two sheep and a goat were administered macerated plant material. All three animals died within six hours.

In the years that followed there appears to have been, judging from descriptions, distribution of species and illustrations in literature, some confusion regarding the identities of Champion Bay poison, sandplain poison, gilbernine poison and the



GILBERNINE POISON

Gilbernine poison, *Gastrolobium rotundifolium* Meissn., is usually associated with wandoo woodland and is found from Mingenew southwards to Wagin. The form illustrated above is the more typical form. The variation *angustifolium* found in the Miling district has narrower leaves with margins inrolled underneath.

then undescribed cluster poison and Hutt River poison. This confusion was largely sorted out by Gardner (1942, 1955).

The toxic nature of these plants has been reported by Bentham (1864), Herbert (1921), Carne, Gardner and Bennetts (1926), Gardner (1937) and Gardner and Bennetts (1956). Gardner and Bennetts (1956) reported that both Champion Bay poison and cluster poison were highly toxic to stock, sandplain poison they considered to be toxic.

McEwan (1964) identified the toxic chemical in wall-flower poison as mono-fluoroacetic acid. Almost simultaneously and independently the same toxic chemical was shown to be present in box poison and rock poison by Cannon. Aplin (1967) reported the presence of this toxic chemical in Champion Bay poison, sandplain poison, gilbernine poison and cluster poison. This substance, better known by its sodium salt "1080" the well known rabbit poison, is highly lethal to all domestic stock.

Air-dried samples of cluster poison have been shown to contain up to 1,300 parts per million of "1080" equivalent. At this level of toxicity less than two ounces of green plant material would be sufficient to kill an adult sheep. Similar samples of Champion Bay poison, sandplain poison and gilbernine poison have been shown to contain up to 1,050, 600 and 150 parts per million respectively. In the one sample of Hutt River poison tested to date, no toxic principle could be detected chemically.

In an experiment to determine chronological variations in toxicity within a particular stand of a toxic species the toxicity in Champion Bay poison was shown to rise from "none detected" to 1,050 parts per million of "1080" equivalent over five weeks in late spring. Earlier in the season there had been minor fluctuations in toxicity.

In another experiment to determine variations in toxicity within particular stands of plants, sandplain poison was shown to vary from "none detected" to 600 parts per million of "1080" equivalent in plots contained within an area of one square chain.

These experiments demonstrated that plants could vary in toxicity even within a relatively small area, and that the relative toxicity of particular stands of

plants could also vary quite considerably from one week to the next.

Toxic plants containing mono-fluoroacetic acid are most dangerous when growth activity is taking place. They are therefore most hazardous when new shoots or suckers appear or when in the flowering or fruiting stage. The toxic chemical is a stable compound so it remains present in the dried leaves of bushes that have been grubbed. These dead bushes should therefore be heaped and burnt rather than left for stock to eat. There is no effective remedial treatment for stock once they have eaten these poisonous plants in lethal quantities.

All five species dealt with in this article sucker when cut at ground level. Plants should therefore be grubbed, and the soil repacked and firmed down in the cavity made when the plant is removed, in order to prevent suckering from the roots.

The five species, particularly Champion Bay poison and cluster poison, can be highly toxic to stock. It is important for farmers and graziers to learn to recognise these toxic species in the forms that they assume in their particular districts. Areas containing these plants should be fenced off and the plants then eradicated completely before stock are introduced.

To be certain of the identity of toxic species, specimens of suspected poison plants should be submitted to the Officer in Charge, Botany Branch, Department of Agriculture, Jarrah Road, South Perth, for identification and comment.

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