Having a name for biological species is desirable if we want to seek, store andutilize biological data on things like reproduction, seed germination, seed longevity, fire response etc. and ecological information on the species. John Scott will undoubtedly mention the need to know the names of species we are dealing with in the case of seeking biological control agents. However, in the genus *Watsonia* we have some problems naming the species present in WA.

How many species do we have recorded in this State?

A taxonomic account of all species of *Watsonia* in Australia was published in 'Flora of Australia' in 1986, but this only recognized six species (Table 1). The Western Australian species were studied by Gillian Perry at the WA Herbarium, in preparing the 'Flora of the Perth Region' which was published in 1987, two years before publication of Goldblatt's detailed study of all species (Table 1). We believed that there were eight species recorded for WA; these are treated differently in Goldblatt so, how do we deal with this taxonomic confusion?

Why is there so much discrepancy in the application of names? The reason must be that in WA we have variants which arose through cultivation and we have hybrids, some of which were probably selected in the gardens at Rondebosch 163 years ago and some of which probably arose here in WA.

At this stage of our knowledge we need not be concerned that we have difficulty in identifying the species we have; we can use interim names. We may use for example, a temporary or interim name like *Watsonia* species A or *Watsonia* "Busselton pink". This poses no problem when we have computer databases which can cope with temporary names and easily enter other names as they are determined. The Department of Conservation and Land Management's Herbarium has a sophisticated database which already has the watsonia collections entered. However, we need more specimens with full annotations on their locality, habitat and other observations which will enable us to build up a useful database of the biology of these insidious plants.

Distribution, impact and biology of the other "watsonias", *Chasmanthe* (African Corn Flag) and *Crocosmia* (Montbretia) in Western Australia

Greg Keighery, Department of Conservation and Land Management, PO Box 51, Wanneroo, WA 6065, Australia.

Summary

***Chasmanthe* is widespread throughout the lower south west of Western Australia. *Chasmanthe* has been recorded from 13 conservation reserves, and three forest blocks, chiefly from highly disturbed sites. It can, however, invade bushland if the initial introduction is not removed. Sites most affected appear to be on well drained calcareous soils in contrast to the other "watsonias". *Crocosmia* is sparingly naturalized on vacant lots in towns and road verges only in the higher rainfall areas of south Western Australia.**

Introduction

Chasmanthe and *Crocosmia* are southern African Iridaceae genera of three (De Vos 1985) and nine species (De Vos 1984) respectively. One species of each genus, *Chasmanthe floribunda* (Salisb.) N.E.Br. and *Crocosmia* × *crocosmiifolia* (Lemoine ex Morren) N.E. Br. has become naturalized in Australia (Cooke 1984). Both species were widely grown as ornamentals (Montbretia is still available in the nursery trade) and were originally introduced as such. These two species have a very similar habit to watsonia in leaf, and are chiefly distinguished by weed control personnel and the public as "another species of watsonia" even when in flower.

Only in Western Australia are both varieties of *Chasmanthe floribunda* naturalized: the typical var. *floribunda* with orange flowers and var. *duckittii* G. Lewis ex L. Bol. with yellow flowers, yellow-brown anthers and a shorter floral tube.

Methods

Distribution data was obtained from road logs, field note books and reserve lists compiled by the author from 1985 to the present. All available published and

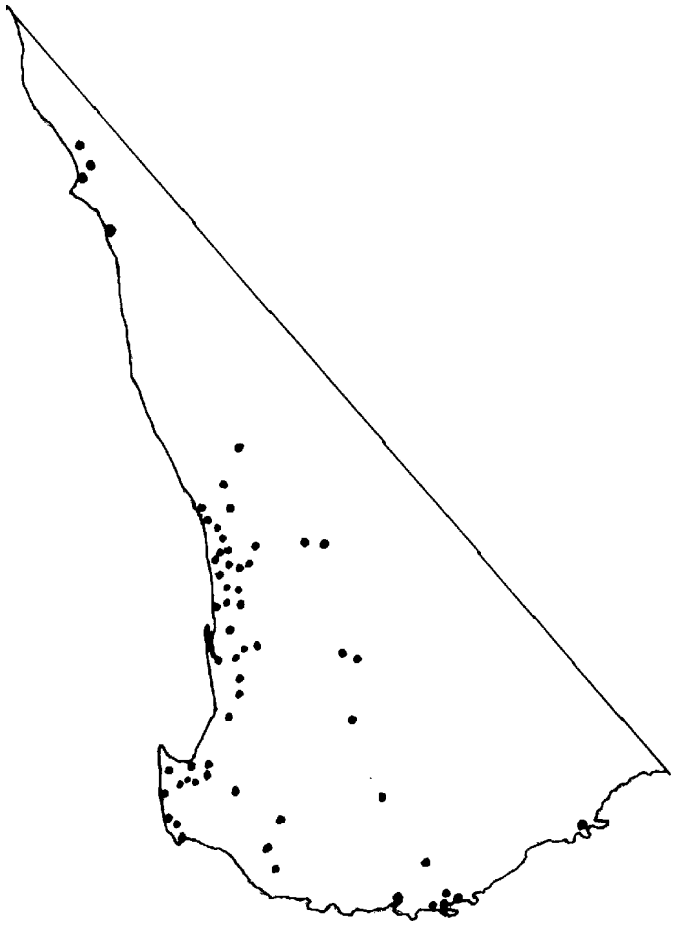

Figure 1. Distribution of *Chasmanthe floribunda* in Western Australia.

Table 1. *Chasmanthe* occurrence in conservation areas.

Area	Vegetation	Source
Wambyn NR	Marri woodland	1
John Forest NP	Streamline	1
Serpentine NP	Streamline	1
Yanchep NP	Tuart woodland	1
Star Swamp	Heath	Bell *et al. (*1979)
Kings Park	Limestone heath	1
Mount Brown (M 92)	Limestone heath	1
Maylands foreshore (M 50)	Drain	Meney (1987)
Point Resolution (M 59)	Limestone quarry	1
Freshwater Bay (M 54)	Disturbed tuart woodland	1
Ruabon NR	Old clearing	1
Leeuwin-Naturaliste NP	Disturbed karri (Boranup)	1
Ellen Brook	Streamside	1
Bold Park	Roadside	1

NR Nature Reserve
NP National Park
1 This paper

Table 2. *Chasmanthe* occurrence in State Forest areas.

Area or Forest Block	CALM District	Site
Dryandra Forest	Narrogin	Disturbed
Happy Valley Block	Kirup	Track
Myalup Block	Harvey	Settlement

manuscript bushland lists and collections in the Western Australian Herbarium were also consulted.

Results and discussion

Distribution

Chasmanthe is widespread throughout the wetter areas of the lower south west of Western Australia, with over 120 localities recorded, although over half of these are in the Perth metropolitan area. Populations were found from Gin Gin in the north, Narrogin inland and Albany in the east (Figure 1). Disjunct occurrences were recorded at Northampton (28.21 S, 114.38 E) and Bremer Bay (34.24 S, 119.23 E).

Chasmanthe floribunda var. *duckittii* has only been recorded as naturalized on the Swan Coastal Plain from four localities: near Naval Base, 18 km south of Fremantle (System Six area M 92); Mount Eliza; Buckland Hill; and Waterloo, 13 km north of Bunbury.

Most populations consist of 50–100 plants, occupying less than 200 square metres in area. They are largely found on vacant lots, old refuse sites and road and rail reserves.

Chasmanthe has been recorded from 13 actual or proposed conservation reserves (Table 1) and three State Forest blocks (Table 2) in south western Australia.

These infestations are chiefly around old townsites or rubbish dumps, or spreading along tracks, indicating that human activity is the primary agent of spread. Invasion into intact remnant vegetation can occur, via soil disturbance and seed dispersal, especially after fires. *Chasmanthe* is abundant in areas of the Mount Eliza escarpment of Kings Park, but is also widespread, though scattered, in the remainder of the bushland (I.R. Dixon personal communication). *Chasmanthe* has also been recorded in the Perth area invading limestone heath at Mt Brown (System Six area M 92), under Tuart woodland at Woodman's Point, along the Swan River at Peppermint Grove (System Six area M 54) and Point Resolution (System Six area M 59) and in Tuart woodland at Star Swamp Bushland Reserve.

Crocosmia (Figure 2) is only found in the high rainfall region of south western Western Australia, between Albany (35.02 S, 117.53 E) and Margaret River (33.57 S, 115.04 E). In this region the species has been recorded along roadsides, very disturbed creeklines and grassy river banks, and on vacant lots. Nearly all of these occurrences can be related to dumping of garden refuse or old habitation sites. It has only been recorded in a single conservation reserve, West Cape Howe National Park, where it is growing in an old unrehabilitated gravel pit. The largest populations are around Wilson's Inlet, at Denmark.

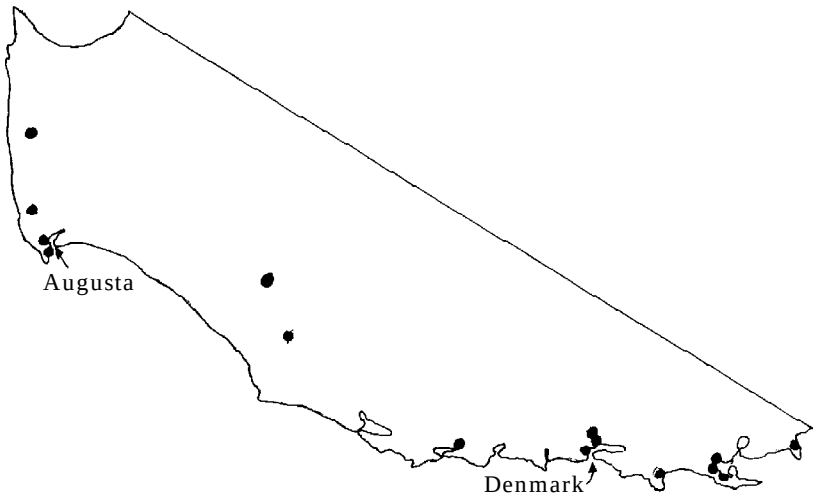

Figure 2. Distribution of *Crocosmia* × *crocosmiifolia* in Western Australia.

Biology

Crocosmia (Montbretia) is a garden hybrid between *Crocosmia aurea* (Pappe ex Hook) Planchon and *Crocosmia pottsii* (Baker) N.E.Br., created in France in 1880. Plants flower prolifically between December and February, but almost no viable seed is set. Plants spread slowly via offshoots.

Chasmanthe flowers from July to September, the bright red to yellow flowers attract nectar feeding birds, and copious amounts of viable seed are set. Daughter cormlets are produced at the end of the growing season.

Weediness

Approximately 42 taxa of the family Iridaceae are naturalized in Western Australia (Table 3). Several are very significant weeds of both agricultural and conservation lands. Table 3 lists the naturalized Iridaceae of Western Australia rated as major, local, minor and non-bushland weeds based on their actual and potential impact on conservation areas. This rating can be best demonstrated by considering examples of some of the most serious weeds given below:

Freesia × *leichtlinii*

No. populations – greater than 100
Spread – Perth to Israelite Bay
Presence in bushland – numerous populations
Effects – smothers bulbous and annual herbs
Seeding – prolific
Vegetative spread – produces 1 to 5

Table 3. The major and minor environmental weeds in the family Iridaceae in Western Australia.

Major Weeds	Local weeds	Minor weeds (species that have rarely been recorded in bushland)	Non Bushland weeds (species that have not been recorded in bushland)
Ferraria crispa	*Babiana disticha*	*Babiana tuberosa*	*Babiana stricta*
Freesia × *leichtlinii*	*Chasmanthe floribunda*	*Gladiolus angustus*	*Crocosmia* × *crocosmiifolia*
Gladiolus caryophyllaceus	*Hexaglottis lewisae*	*Gynandiris setifolia*	*Gladiolus alatus*
Gladiolus undulatus	*Hesperantha falcata*	*Homoglossum watsonianum*	*Gladiolus carneus (cardinalis)*
Homeria flaccida	*Romulea rosea* var. *communis*	*Homeria collina*	*Gladiolus communis*
Sparaxis bulbifera	*Watsonia marginata*	*Moraea vegeta*	*Gladiolus tristis*
Romulea rosea var. *australis*	*Watsonia versfeldii*	*Ixia maculata*	*Homeria ochroleuca*
Watsonia borbonica		*Ixia polystachya*	*Iris germanica*
Watsonia meriana cv *bulbillifera*		*Romulea flava*	*Homeria collina*
Watsonia meriana		*Romulea minutiflora*	*Ixia paniculata*
		Romulea obscura	*Sparaxis pillansii*
		Tritonia lineata	*Sisyrinchium ?iridifolium*
		Watsonia aletroides	*Tritonia squalida (crocata)*

daughter corms per year
Ease of control – little known
Comments – a serious weed of granite rocks, wandoo, marri and tuart woodlands

Romulea rosea var. *australis*
No. populations – greater than 1000
Spread – Geraldton to Israelite Bay
Presence in bushland – numerous populations
Effects – smothers bulbous and annual herbs
Seeding – prolific
Vegetative spread – produces daughter corms each year
Ease of control – little known
Comments – a serious weed of granite rocks, limestone heath and woodlands; impact in other bushland areas unknown

Gladiolus caryophyllaceus
No. populations – greater than 100.
Spread – Lancelin to Perth (however when field surveyed in 1990/91 I discovered populations at Eagle Bay, 250 km south of Perth, and east of Lake Grace, 250 km south east of Perth!)
Presence in bushland – numerous populations
Effects – unknown, potentially serious
Seeding – prolific
Vegetative spread – unknown
Ease of control – little known
Comments – potentially a widespread serious weed of sandy soils throughout southern Western Australia and at the very least has significant visual impact

Ferraria crispa (considered the lowest ranked serious weed)
No. populations – greater than 40
Spread – Perth to Cheyne Bay
Presence in bushland – scattered populations
Effects – potentially a serious weed in coastal heath, especially at Rottnest Island
Seeding – prolific
Vegetative spread – produces daughter corms each year
Ease of control – little known

If *Chasmanthe* and *Crocosmia* are considered according to the same criteria:

Chasmanthe
No. populations – greater than 100
Spread – Geraldton to Bremer Bay
Presence in bushland – few populations
Effects – unknown, rarely serious
Seeding – moderate
Vegetative spread – present but low
Ease of control – as for watsonia species

Crocosmia
No. populations – greater than 10
Spread – Albany to Margaret River
Presence in bushland – not recorded
Effects – none known
Seeding – low
Vegetative spread – present
Ease of control – as for watsonia species

Therefore *Chasmanthe* is listed as a local weed as, while it is widespread, it has only been observed to invade disturbed bushland. *Crocosmia* (Montbretia) however, is not widespread and does not appear capable of invading bushland so is listed as a non-bushland weed.

Conclusions

Both species appear to be relatively minor environmental weeds in Western Australia. However, Carr *et al.* (1992) in their study of Victoria's environmental weeds rate *Crocosmia* as a very serious weed of dry coastal vegetation, lowland grassy woodlands, dry, damp and wet sclerophyll forest and woodland and riparian vegetation. They also rate *Chasmanthe* as a serious weed of lowland grassy woodlands, dry, damp and wet sclerophyll forest and woodland. This information indicates that both of these weeds have the potential to become major environmental weeds, especially with increasing levels of disturbance in bushland. The removal of all populations from conservation areas in Western Australia is the obvious course of action.

References

Bell, D.T., Loneragan, W.A. and Dodd, J. (1979). Preliminary Vegetation Survey of Star Swamp and Vicinity, Western Australia. *WA Herbarium Research Notes* 2, 1-21.

Carr, G.W., Yugovic, J.V. and Robinson, K.E. (1992). 'Environmental Weed Invasions in Victoria'. Department of Conservation and Environment and Ecological Horticulture, Melbourne.

Cooke, D.A. (1984). 'Iridaceae in Flora of Australia' Volume 46. Australian Government Publishing Service.

De Vos, M.P. (1984). The African genus *Crocosmia. Jn. S. Af. Bot.* 50, 463-502.

De Vos, M.P. (1985). The African genus *Chasmanthe. Jn. S. Af. Bot*. 51, 253-61.

Meney, K. (1987). Maylands Foreshore Reserve Management Plan, City of Stirling.