



Population count and assessment of
Rutidosia heterogama (Asteraceae),
Lower Hunter & Central Coast.



Report to

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EXECUTIVE SUMMARY

Rutidosia heterogama is a small daisy within the Asteraceae family, which is currently listed as Vulnerable on both the NSW *Threatened Species Conservation Act 1995* and the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999*. Recent records of this species have surfaced in the lower Hunter Valley and Central Coast, one of which lies within the proposed Warnervale town centre site in Wyong LGA. As a consequence, a targeted survey was commissioned to allow a more confident assessment of its conservation status in the region to be ascertained.

A wide-ranging search for other occurrences of the plant in the Central Coast and Lower Hunter found 12 additional extant locations extending from the Cessnock/Kurri Kurri/Paxton area in the north to the Warnervale area in the south. With the exception of at least two populations near Cessnock, none of these populations were large and only one is protected within secure reserve. Further, most of the occurrences of the plant were in areas that were subject to future development pressures with the prospects for the plant in the region looking poor.

A literature survey revealed no information available that was specific to the ecology and biology of *R. heterogama*. However a threatened congener *R. leptorhynchoidea* (from southern NSW and VIC) has been extensively researched and some inferences concerning *R. heterogama* can be drawn from this research. *Rutidosia heterogama* is most likely to be reproductively self-incompatible, which means that populations need to contain sufficient genetic diversity to allow fertile seed production to occur. In small and reproductively isolated populations this incompatibility can breakdown and result in a decline in the viability of the population.

Genetic examination of plants in relocated populations of *R. leptorhynchoidea* have shown that mixing plants from widely separate locations can itself result in genetic aberrations in the offspring due to the mixing of locally adapted genotypes. In the case of three of the thirteen extant populations of *R. heterogama* (each of <100 plants) from the lower Hunter and Central Coast, it would seem possible that plants could be added to those from nearby populations to create new and potentially viable populations in more secure tenure. The plants at these three populations appear to have little prospect of surviving in the long term due to surrounding development and their isolation from other populations. The boosting of existing populations in land having the appropriate tenure would be a preferable outcome to that of destroying existing plants.

Within the region, an estimate of 30000 plants of *Rutidosia heterogama* has been made, although detailed counts have not been made at any of the populations within the Cessnock area, several of which appear to number in their 1000's. On current information, Wyong LGA supports around 2000 plants, Lake Macquarie LGA 500, and Cessnock LGA in excess of 25000 plants.

In relation to the Wyong populations, recommendations have been made concerning possible conservation outcomes for the species, including suggestions that the potential for plant translocations be explored in those areas particularly threatened by development, and that research be undertaken on genetics and pollination biology of the species.

Table of Contents

1.0	Background	3
2.0	Target Species: <i>Rutidosia heterogama</i>	3
2.1	Ecology & Distribution.....	3
2.2	Conservation Status	4
2.3	Historical Records	5
3.0	Methods.....	6
3.1	Targeted Search.....	6
3.2	Population Counts.....	6
3.3	Habitat Assessment.....	6
4.0	Results	7
4.1	Targeted Search.....	7
4.2	Population Counts.....	8
4.3	Habitat Assessments	9
5.0	Discussion	13
5.1	Distribution and Abundance.....	13
5.2	Habitat on the Central Coast/ Hunter Valley	13
5.3	Viability of Fragmented Populations.....	15
5.4	On-going Management.....	15
5.5	Translocation	15
6.0	Conclusions & Recommendations	16
7.0	References	19
8.0	Acknowledgements.....	21

1.0 Background

As part of a vegetation survey and mapping project being undertaken by Forest Fauna Surveys Pty Ltd and Eastcoast Flora Survey for the proposed Warnervale Town Centre (Murray & Bell 2004), a population of *Rutidosia heterogama* was discovered adjacent to the Main Northern Railway Line at Hamlyn Terrace, Warnervale (Wyong LGA). *Rutidosia heterogama* is listed both nationally and within New South Wales as a vulnerable species under the *Environment Protection & Biodiversity Conservation Act 1999*, and *Threatened Species Conservation Act 1995* respectively.

In order to ascertain the local significance of this population, Wyong Shire Council has requested that an additional targeted survey for *Rutidosia heterogama* be undertaken within the wider Warnervale area. Coincidentally, one of us (CD) was also asked to survey for this species in the southern Lake Macquarie area in relation to a separate proposed development, and the two projects effectively dovetailed to form a sub-regional survey for the species. This report details the results of this survey in the Warnervale area, and outlines possible conservation scenarios for this species within Wyong LGA. Information obtained during the Lake Macquarie study has also been incorporated where relevant, as has other information about the species in the Cessnock area. This report therefore presents a sub-regional overview of the species within the Warnervale-to-Cessnock area, within the Lower Hunter and Central Coast region.

2.0 Target Species: *Rutidosia heterogama*

2.1 Ecology & Distribution

Rutidosia heterogama lies within the Asteraceae family of flowering plants, and is one of five species in New South Wales, and seven in Australia (Harden 1992). It reportedly occurs mostly in heath, often along disturbed roadsides, in coastal districts from Maclean to the Hunter Valley, and inland to Torrington. This species was formerly unknown south of the Hunter Valley (Harden 1992), and its occurrence at Warnervale represents a significant disjunct population extending its geographical range onto the Central Coast botanical subdivision. Historical records do exist for Sydney, although the plant is now considered extinct there.

Rutidosia heterogama is a perennial plant that has either a low spreading form, or an erect form up to 30cm high. The leaves and stem are generally hairless, often with a grouping of leaves at the base of a flowering stem, and smaller leaves arranged alternately along the stem. The leaves themselves are straight, narrow and have margins that are slightly rolled under. There can be several flowering stems, each with a single terminal flower branching from a main stem with the flower being yellow-orange in colour and from 1-2cm in diameter (Figures 1 - 3). *Rutidosia heterogama* can be readily confused with the common dandelion, *Taraxacum officinale* and is also superficially similar to another native daisy, *Helichrysum scorpioides* with the two species found growing together in some of the populations in the Cessnock LGA.

In the last few years, several populations of *Rutidosia heterogama* have surfaced in the lower Hunter Valley area. Probably the largest and most controversial has been near Cessnock within the proposed Hunter Economic Zone. Details on this population, and estimates of its size, have been detailed in HSO (2004) and Bell (2004), and in that area the species most commonly occurs within the Lower Hunter Spotted Gum – Ironbark Forest of NPWS (2000). Other populations have been discovered in the Cooranbong area of Lake Macquarie, and are detailed more fully in Driscoll and Bell (2004). Stevenson (2004) notes that a population of around 2000 plants has been reported for a site at Cooranbong, however we are currently investigating the accuracy of this assessment, as our observations to date would indicate that this is an over-estimate.

Within the literature, few studies on ecology or habitat for *Rutidosia heterogama* could be found. Steenbeeke (1998) briefly outlines a description of the plant, together with habitat details including its occurrence in dry sclerophyll forest and woodland, heath, dunes (including stabilised dunes), and disturbed areas. He also states that flowering occurs during Autumn.



Figures 1-3: *Rutidosia heterogama* plant (© C.Driscoll); flower head (© S.Bell); and fruiting head (© S.Bell).

Several other studies on the related *Rutidosia leptorhynchoides*, an endangered species from Victoria and the Canberra district, are also within the literature (Scarlett & Parsons 1990; Leeton & Fripp 1991; Morgan 1995a, 1995b; Young & Brown 1999; Young & Murray 2000; Young *et al.* 1999; Young *et al.* 2000). Some work has also been undertaken on *Rutidosia leiolepis* from sub-alpine regions of southern NSW and Victoria (Young *et al.* 2002). These studies indicate that flowers are insect pollinated, self-incompatible and that seed is wind-dispersed with dispersal distances of only about 0.5 metres. Seed bank life-span is also reportedly limited to a few months (Morgan 1995a, 1995b; Young *et al.*, 2000; Young *et al.*, 2002). These findings are perhaps applicable to other members of the *Rutidosia* genus, including *R. heterogama*. There is an obvious gap in the ecological knowledge of *Rutidosia heterogama* at present, including that of preferred habitat. Harden (1992) reports only heath for this species, yet in our experience within the Central Coast and lower Hunter Valley, this species occurs in open forest and woodland of various types.

2.2 Conservation Status

Briggs and Leigh (1995) list *Rutidosia heterogama* with a conservation risk code of 2VCa. They indicate that populations of adequate size (ie: >1000 plants) are present within Bundjalung and Yuraygir National Parks on the far North Coast of New South Wales. Both of these reserves conserve sand-based vegetation occurring on Pleistocene sands adjacent to the coast, although collection notes accompanying herbarium specimens suggest that *Rutidosia heterogama* occurs on clay soils. NPWS (1997) also list this species for Iluka Nature Reserve, although no information is available on population size, and Stevenson (2004) includes Torrington State Conservation Area. Although no counts have been made, there are estimates of up to 1000 plants occurring on granite soils within Torrington SCA (L. Copeland, Botany Department, UNE, pers. comm.). *Rutidosia heterogama* is included in the Schedules of vulnerable species on the *Threatened Species Conservation Act 1995* and the *Environment Protection & Biodiversity Conservation Act*