in order to reach the phloem. The movement of herbicide may be restricted by chemical interaction between the herbicide molecule and the arabinogalactan, or by the viscosity of the arabinogalactan colloid.

Fruitful areas for research clearly include:

(1) further work on the identification of the polysaccharides, and elucidation of their chemical structures, particularly the arabinogalactan

(2) confirmation of the distribution of the polysaccharides of Harrisia cactus at a cellular level

(3) determining whether the polysaccharides (or other plant constituents) are capable of direct chemical combination with herbicide molecules

(4) more investigations like those of Brian and Rideal on the adsorption of herbicides by films of plant constituents

(5) elucidation of the pathways by which herbicides move into the plant and by which they are moved in the plant

ADONIS SPP. IN SOUTH-EASTERN AUSTRALIA

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The annual species of *Adonis* (*Adonis* Sect. *Adonis*), known generally as pheasants's eye, originated in the Mediterranean basin. Most species have been spread throughout the world and some have reached Australia.

It was first noted at Inverell in New South Wales and Goondiwindi in southern Queensland in 1905. The first collections in South Australia were made in 1915 at Roseworthy and in 1917 between Blyth and Clare in the Lower North (Black, 1940). Since then it has spread considerably and is now also recorded in Victoria. In South Australia, it has become a serious weed of the pasture years of crop-pasture rotations. Some interim results of current studies concerning the taxonomy and

distribution of *Adonis* in Australia are presented here.

The taxonomy of the annual *Adonis* spp. is extremely confused. Riedl (1962) explains why this is so and presents a thorough revision.

The eminent botanist J.M. Black identified early South Australian specimens as *A. autumnalis* (Black, 1919). His notes indicate that he was unsure of this and he later published an amended identification of the same material as *A. aestivalis* (Black, 1940). However, in his Flora (Black, 1948) he reversed his decision. Eichler (1965) corrected this to *A. annua* and stated that, if the identification of the South Australian specimens were correct, *A. aestivalis* was also present in the State.

Careful examination of material in herbaria at Adelaide, Melbourne, and Sydney has indicated that *A. aestivalis* does not occur in their local collections. The Australian representatives are likely to be *A. microcarpa.* (S.A., Vic., N.S.W.), *A. dentata* (N.S.W.), and *A. intermedia* (S.A., N.S.W.).

Since the early 1960s these plants have become a troublesome weed on Yorke Peninsula and adjacent areas (Winn, 1965). The only other places where these species seem to be weeds of any significance is France (Fron, 1917) and Utah, USA (Holmgren, 1958). For some reason, in those places it is a crop weed not a pasture weed.

There are quite definite boundaries to this weed's distribution, furthermore the various species are distributed differentially. Their local ranges correspond quite closely, ecologically, with their native habitats.

RAINFALL

In south-eastern Australia the lower limit appears to be 14 in. per year (350 mm). The upper limit is 20 in. per year (500 mm) with a patch between 20 and 24 in. (500-600 mm) in the Lower North of South Australia. This latter population appears to be *A. annua.*

SOILS

Significant infestations of this weed appear to be confined to mallee soils or various types of red-brown earths. These are characterized by neutral to alkaline topsoil and alkaline subsoils. Often there is free lime present.

The more troublesome species appears to be *A. microcarpa* of Yorke Peninsula and adjoining districts. The potential area of infestation of this species seems to be those zones of alkaline soils falling within the 14-20 in. (350-500 mm) rainfall

zone, especially where the soil is periodically disturbed.

Studies in the control of this weed are proceeding, with limited success. It is hoped that an understanding of the ecology of the weed will aid in establishing an effective control.

THREE FORMS OF *CHONDRILLA JUNCEA* PRESENT IN SOUTH-EASTERN AUSTRALIA

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Chondrilla juncea (skeleton weed) has been present in south-eastern Australia for over 50 years. In 1966 we first identified three forms of the species from central New South Wales. The forms differ in several morphological characters - rosette leaf shape, inflorescence habit, inflorescence leaf shape, achene structure. Previous taxonomic treatments of the genus have also used these characters for establishing differences between species of *Chondrilla* in Europe. In all experiments on the effects of different environments rosette leaf shape (the major character investigated, as defined by various quantitative indices) remains constant. We conclude that these forms are genetically stable. Chromosome number is the same for the three forms, being 2n=15.

One form occurs throughout the area of distribution of skeleton weed in south-eastern Australia and it is the form on which all previous studies on control have been done. This form was first identified from the Wagga region in Australia in 1917 and is identical with plants from a number of collections from Europe made in 1968. The other two forms have their present geographic centres in the Cowra-Orange region of New South Wales, where they may have arisen spontaneously or to which they may have been introduced from Europe.

The presence of three forms of skeleton weed in Australia and the polymorphic nature of the species in Europe have added to the complexity of the initial programme for biological