

ECHINOCHLOA BIOTYPES

In most plants the category 'species' is generally 'natural', meaning that the species is composed of plants with a consistent set of characters which, taken as a whole, are invariably present and clearly distinct from the sets of characters possessed by other species. Most species do not interbreed successfully with other species, being functionally separated by factors such as geography, genetic incompatibility, or by the hybrid offspring being poorly adapted to the available habitats.

Some plant species however are incompletely genetically isolated from others (often species which are genetically related in some manner). If two or more genetically compatible species grow in the vicinity of each other (perhaps having been brought together by man), hybridisation can occur. If sufficient of the hybrids survive, they can form a bridge for the passage (introgression) of genes from one species to the other. Gene introgression via interspecific hybridisation is currently a hot topic in view of a glyphosate-resistant crop, wheat, *Triticum aestivum*, exchanging genes with the related weed *Aegilops cylindrica*, jointed goatgrass)¹.

The genus *Echinochloa* contains several apparently natural species, many of which are able to grow in wet or well-watered situations and compete successfully with rice. Many of them have attained transglobal distribution, probably as contaminants of seed-rice. The taxonomy of the genus in its modern habitats has not been completely studied. Nevertheless, there appears to have been considerable gene exchange within the genus, to the extent that some putative species such as *E. crus-galli* appear to be composed of a profusion of morphologically dissimilar populations, and some species seem to have characters which intergrade with those of other species.

Several schemes of classification attempt to impose order on this turbulent genus, but none result in a complete series of clearly distinct species.² Nevertheless, the weed biologist experimenting on populations of *Echinochloa* needs to be certain of the identity and geographical/ecological provenance of his experimental population. Herbiseed has taken the stance of defining its populations of *Echinochloa* seed by probable species, plus country of origin, plus morphological type, referring to all of these as 'biotypes'*

Different biotypes of *Echinochloa* have different growth habit, (plants tall or short, tillers round or flat etc.), or react differently to daylength (day neutral or short day flowering), or show different susceptibilities to standard herbicides. Some biotypes may be naturally tolerant of certain selective herbicides, others are fully resistant. The worldwide distribution of *Echinochloa crus-galli* is characterised by the presence of many different biotypes adapted to the local agronomic and climatic conditions.

¹ Gandhi, H.T., Mallory-Smith, C.A., Watson, C.J.W., Vales, M.I., Zemetra, R.S. and Riera-Lizarazu, O. 2006. Hybridisation between wheat and jointed goatgrass (*Aegilops cylindrica*) under field conditions. *Weed Science* Vol 54 No. 6 pp1073-1079.

² Tabacchi, M., Mantegazza, R., Spada, A. and Ferrero, A. 2006. Morphological traits and molecular markers for classification of *Echinochloa* species from Italian rice fields. *Weed Science* Vol. 54 No. 6 pp 1086-1093

The growing awareness of varying susceptibility to some modern herbicides between species and biotypes of *Echinochloa* has resulted in an increasing interest in comparative studies with several species and biotypes of the genus.

Herbiseed currently has available the following biotypes of *Echinochloa*;

71349	ECHCO	ECHINOCHLOA COLONUM	From rice in Africa
71350	ECHCF	ECHINOCHLOA CRUS GALLI (1. forma frumentacea)	USA origin. Up to 2 metres high. Compact seed head.
71351	ECHCG2	ECHINOCHLOA CRUS GALLI (2. forma longisetata)	From a slightly saline area in Serbia. Over 2 metres high, strongly tillering.
71352	ECHCG3	ECHINOCHLOA CRUS GALLI (3. Very short season biotype)	Very short season biotype from England. Only 1 metre high.
71353	ECHCG4	ECHINOCHLOA CRUS GALLI (4. Tall USA biotype)	Tall USA biotype
71354	ECHCG5	ECHINOCHLOA CRUS GALLI (5. Short USA biotype)	Short USA biotype
71355	ECHCG6	ECHINOCHLOA CRUS GALLI (6. Tall North European biotype)	Tall biotype from maize in Serbia
71356	ECHCG7	ECHINOCHLOA CRUS GALLI (7. Tall South European biotype)	Tall biotype from maize in Germany
71357	ECHCG8	ECHINOCHLOA CRUS GALLI 8	Tall, Southern USA biotype.
71359	ECHCV	ECHINOCHLOA CRUS-PAVONIS	Short biotype from Holland
71360	ECHCF	ECHINOCHLOA FRUMENTACEA	USA origin, compact seed head
71361	ECHCG	ECHINOCHLOA HISPIDULA	Spain
71362	ECHPU	ECHINOCHLOA MURICATA	From wetland in USA
71363	ECHOR	ECHINOCHLOA ORYZICOLA	From the Philippines
71364	ECHOR	ECHINOCHLOA ORYZOIDES	From the Philippines
71365	ECHPH	ECHINOCHLOA PHYLLOPOGON	From the Philippines
71366	ECHUT	ECHINOCHLOA UTILIS	Japanese cultivated crop

GERMINATION

Echinochloa can have a long post-harvest dormancy, which for most batches is alleviated by shelf storage by Herbiseed. A 2 week soak in cold water has also proved to alleviate dormancy in some work. Another suggestion is to store the seed at 30C for three weeks before planting.

* TAXONOMIC NOTE

A biotype is any group of plants which is differentiated from other populations of the same species by a consistently recognisable and genetically determined morphological (shape, size etc) or physiological (reaction to daylength, herbicide response etc.) feature. It is the simplest sub-specific group to define and is therefore widely used by weed scientists. Other taxa tend to be based on morphological characteristics alone. Sub-species is more rigorously defined on a discrete cluster of characters, while *forma* often refers to a single characteristic (eg longisetata) and may not be genetically distinct from other populations of the species.