ESPROCARB HERBICIDE MIXTURES: USE IN JAPANESE PADDY RICE

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ABSTRACT

Esprocarb[S-benzyl-N-ethyl-N-(1,2-dimethylpropyl)thiocarbamate], code name ICIA-2957 (formerly SC-2957) is a pre- and post-emergence herbicide giving effective control of Echinochloa crus-galli and annual weeds in paddy rice. Official field tests throughout Japan demonstrated that combinations with bensulfuron-methyl provided broad spectrum control of annual and perennial weeds with considerable flexibility of timing and crop tolerance in transplanted rice. New combinations of esprocarb with bensulfuron-methyl and third compounds are under development aimed at offering longer residual control of annual weeds, particularly Echinochloa crus-galli, in the cooler regions of Japan.

INTRODUCTION

The main weed species, regional variations and traditional rice herbicide practices in Japan were described by Mizutani in 1986 [1]. But since 1982, when the first so called 'one-shot' herbicides were introduced, farmer practice has changed rapidly. Single applications of a one-shot, or a one-shot application followed by a specific annual weed killer have become the norm, replacing the traditional 2,3 or 4 applications made previously. The time and cost savings achieved with one-shot treatments have led to a rapid expansion of their use. In 1988 58% of the planted area was treated with one-shots and by 1989 this had risen to 74% of the total 1.55 million hectares of paddy rice.
Current one-shot herbicides can be classified into those which are applicable at the early stage of *Echinochloa crus-galli* (pre-emergence to 1.5 leaf stage) and those which are applicable at the early to middle stage (pre-emergence to 2.5 leaf stage).

Since 1986, new types of one-shot herbicides have been tested in official Japanese trials. These are aimed at providing the farmer with longer, residual control of later emerging annual weeds, hence eliminating the need for any follow up application.

Esprocarb is known to be highly effective on *Echinochloa crus-galli* and annual broadleaved weeds [2]. Bensulfuron-methyl (DPX-84) was chosen as a mixture partner because it provides excellent control of perennial weed species [3]. This combination of esprocarb and bensulfuron-methyl was found to give good broad spectrum weed control and good crop tolerance [4]. In Japan, the esprocarb-based combinations have been tested since 1985 by national and prefectural agricultural stations in co-operation with JAPR (Japan Association for the Advancement of Phyto-Regulators).

This paper describes the use of esprocarb in one-shot herbicide mixtures developed and under development for transplanted rice in Japan. The mixtures that include esprocarb, bensulfuron-methyl and a third active ingredient have been included specifically to evaluate residual control of later emerging annual weeds. These latter studies have been carried out in special co-operation with Nihon Nohyaku Co.

**MATERIALS AND METHODS**

a. **Herbicides**

Code name: ICIA-2957 (formerly SC-2957)

Common name: Esprocarb

Chemical name: [S-benzyl-N-ethyl-N-(1,2-dimethylpropyl)thiocarbamate]

Chemical Structure

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\begin{align*}
&\text{CH}_2\text{SCN} \\
&\text{CH}_2\text{CH}_3 \\
&\text{CH}_3\text{CH}_3
\end{align*}
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