INTRODUCTION
Glyphosate is the most important herbicide used worldwide and since 2000 the problem of glyphosate resistance is exponentially increased. Glyphosate resistance in Mediterranean area was reported for Conyza bonanisiensis, C. canadensis, C. sumatrensis and Lolium rigidum particularly in perennial cops. Recently a survey was carried out in Portugal, to respond to growers complaints of poor control of Lolium spp. in vineyards (Douro, North Portugal). In 2012 glyphosate resistance was confirmed in two vineyards with Lolium perenne populations (Portugal et al., 2013). To study the extent of glyphosate resistance and looking for IWM strategies to control the problem two extended surveys were conducted in 2012 and 2013 together with field experiments with herbicide in IWM programs.

MATERIAL AND METHODS

FIELD TRIALS
An IWM programme with herbicide and mowing was carried out in two trials in Douro vineyards to assess Lolium perenne control with ACCCase – and ALS-inhibiting herbicides (cycloxydim, clethodim, quizalofop-butyl, flazasulfuron), applied either in mixture or sequence with glyphosate – Table 1.

RESULTS AND DISCUSSION

SOIL SEED BANK
In RÉGUA (trial 1) weed control strategy had different efficacy according to herbicides. For clethodim (7 and 8), quizalofop-P-ethyl (13 and 14) and flazasulfuron (15 and 16) the efficacy of sequence application was significantly higher than the mixture with glyphosate. For cycloxydim (9 and 10) and flazasulfuron (11 and 12) the efficacy was high either for mixed or sequence applications, 97.5 % and 93.3 % (90 DAT) and 96.7 % and 95.0 % (120 DAT) respectively. Confirming the results of last year trial in the same location (Calha et al., 2012).

In PINHÃO, Lolium seed bank in integrated treatment were significantly lower than in glyphosate treatment and similar to mowing alone. Confirming the effect of mowing in reducing the Lolium seed bank (F= 5.26, p < 0.01). Long term application of glyphosate on Douro vineyards had already selected for resistance on seed bank. In fact, 80 to 90 % of the Lolium seedlings emerged were resistant to glyphosate.

CONCLUSIONS
Sequence application of herbicides was either more or as effective in controlling L. perenne populations than mixtures of the same herbicides. Mowing with glyphosate application could be an effective integrated weed management (IWM) to limit the dissemination of resistant biotypes as it prevents seed set and reduces soil seed bank.

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