Control of weeds in glasshouse and rice field conditions by phytotoxic effects of Tinospora crispa (L.) Hook. f. & Thomson leaves

ABSTRACT

Phytotoxic potential of powder and methanol extract of *Tinospora crispa* (L.) Hook. f. & Thomson leaves as pre- and post-emergence applications on the growth of transplanted rice (*Oryza sativa* L.) and associated weeds were evaluated under glasshouse and field conditions to determine its herbicidal activity as soil additive material in rice fields. In glasshouse study, utilization of leaf powder and leaf extract of *T. crispa* as pre-emergence application provided a satisfactory weed control, inhibiting seed germination and reducing the growth of germinated seedlings with an increase in the yield of transplanted rice. The magnitude of the phytotoxic effects at the same concentration levels in the test plants was dependent on the application methods (powder and extract), time of application (pre-and post-emergence), concentration and the recipient species. Field experiment consisted of *T. crispa* leaf powder (1, 2 and 4 t ha^{1}), chemical herbicide (pretilachlor + pyribenzoxim at 1 L ha^{-1}) as positive control and a negative control (no treatment). There was nonsignificant difference between leaf powder-treated plots (2 and 4 t ha^{-1} doses) and plots that received herbicidal treatment in terms of percentage reduction of emergence and weed DM. In plots amended with 1, 2 and 4 t ha^{-1} leaf powder, weed dry weight was reduced by nearly 80%, 97% and 99% and total weed seedling density was inhibited by 73%, 94% and 99%, respectively, compared to untreated plots. There was a significant promotion on grain yield, straw dry weight and number of seed per panicle of rice, when treated with leaf powders and chemical herbicide compared with negative control. These results suggest that *T. crispa* has a significant phytotoxic activity on the germination and growth of weed species in rice fields.