

Category	: International Rice Research Conference
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Keyword 1	: Weed management
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Title of Entry	: Herbicide Options for Cost-effective Management of Complex Weed Flora in Mechanized Dry-Seeded Basmati Rice of Punjab, Pakistan
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**Abstract** : Dry-seeded rice (DSR) is an emerging technology in Pakistan largely because of the higher cost of pumped groundwater and shortage of labour for transplation, but weeds remain the major threat to the production of DSR. A field study was conducted in 2016 and 2017 rice seasons at the Rice Research Institute, Kala Shah Kaku and Adaptive-Research Farm Sheikhpura, to evaluate performance of sole and sequential applications of pre-emergence (pendimethalin) and post-emergence herbicides (bispyribac-sodium, fenoxaprop-p-ethyl, ethoxysulfuron, cyhalofop, colomazon), and their company mixtures (bispyribac-sodium+bensulfuron, fenoxaprop-p-ethyl+ethoxyxulfuron+isoxadifen, bispyribac-sodium+bensulfuron+fenoxaprop-p-ethyl, bispyribac-sodium+bensulfuron+clodinfop) with different modes of action in comparison to non-treated control plot in DSR. The sequential applications of all pre- and post-emergence herbicides reduced weed density by 60–93% and biomass by 48–89% compared to the non-treated plots. The sole application of post-emergence herbicides reduced weed density by 50–59% and weed biomass by 49–67%, whereas sole application of pre-emergence (pendimethalin) alone reduced weed density and biomass by 44 and 43%, respectively, compared with the non-treated control plots. All herbicide treatments significantly affected tiller number, biomass, crop growth rate, agronomic indices, yield-contributing parameters (panicle density and filled grains), and yield (biological and grain) of rice. The highest grain yield (3.0–4.6 t ha<sup>-1</sup>) was obtained in the plots treated with sequential application of pendimethalin and followed by company mixture of post-emergence herbicides as compared to sole application of pre- and post-emergence herbicides. Among the sequential application of herbicide treatments, rice plots treated with pendimehalin followed by fenoxaprop-p-ethyl+ethoxyxulfuron+isoxadifen, pendimehalin followed by bispyribac-sodium+bensulfuron+fenoxaprop-p-ethyl, pendimehalin followed by bispyribac-sodium+bensulfuron+clodinfop had grain yield increments of 19–20 times that of the yield in non-treated plots and provided the highest net profit and benefit-cost ratio in both years as compared to other sole and sequential application of herbicides. The lowest paddy yield (0.23 t ha<sup>-1</sup>) was achieved in the non-treated plots followed by the plots treated with pendimethalin alone (1.5–2.4 t ha<sup>-1</sup>), pendimethalin followed by colomazon (2.3 t ha<sup>-1</sup>). The results suggest that pendimethalin is the best economical herbicide when applied with other effective post-emergence herbicides with different modes of actions (ALS and ACCase inhibitors), depending on the weed species present in the field.

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