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*Full Length Research Paper*

# Evaluation of different formulated post emergence herbicide on the weed control efficiency and performance of transplanted lowland rice (*oryza sativa*) at Badeggi and Yandev

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**A field experiment was conducted during the raining season of 2010 at the experimental field of National Cereals Research Institute, Yandev and Badeggi to evaluate post emergence herbicides on control efficiency and performance of transplanted lowland rice. The treatments were Orizo plus at 4 litres per hectare, 2.4 kg propanil plus 375 ml MCPA /ha, 2.4 kg propanil plus 200 ml MCPA/ha, 2.4 kg propanil plus 120 g condax, applied at 3 weeks after planting. 1.6 kg propanil plus 250 ml/ha MCPA was applied at 3 and 5 weeks after planting. Also 240 g condax per hectare was applied at planting and 3 weeks after planting and Butaclor 4 L/ha at planting. Other treatments included hand weeding at 3 and 6 weeks after planting and a weedy check as control. The experiments were laid out in a Complete Randomized Block Design and replicated thrice. The variety of rice used was FARO 52 (WITA 4). Application of 2.4 kg propanil plus 375 ml MCPA /ha, 2.4 kg propanil plus 200 ml MCPA/ha drastically reduced both weed density and dry matter at both location throughout the sampling periods. Higher weed control efficiency was also recorded with application of 2.4 kg propanil plus 375 ml MCPA /ha and 2.4 kg propanil plus 200 ml MCPA/ha. Rice yield and yield components were superior with the application of 2.4 kg propanil plus 375 ml MCPA /ha and 2.4 kg propanil plus 200 ml MCPA/ha.**

**Key words:** Evaluation, post emergence, efficiency, transplanted, rice.

## INTRODUCTION

Rice is a major staple food in both developing and developed world and its production has been essential for many countries. More than one third of the human population rely on rice for their sustenance, making it the most important of the world's food crops ( Morteza et al., 2008).

One of the major problems limiting rice production is weed infestation (Ibeawuchi et al., 2007). In Nigeria, weed control is a serious problem confronting farmers in their efforts to feed the nation's teeming population. Herbicides have been playing an important role in world agriculture for the past four decades and will, for the foreseeable future continue to do so. This is because they are more than any other tool so far developed for weed control by man that are able to destroy weeds on a large scale before or at emergence without disturbing the crops or soils and without heavy dependence on human labor (Akobundu 1987). 0ne of the most labor demanding operations in rice production is weed control. Weeding by hand is the common practice of controlling weeds in Nigeria. This method is tedious due to shortage of labor and as such is usually curtailed and inadequately executed resulting in yield reductions. The use of herbicides in intensive rice cultivation therefore is gaining widespread acceptance among rice farmer in Nigeria. Consequently, there is a dire need to continuously evaluate new selective post emergence herbicides for broad spectrum weed control in rice field. Keeping this in view the present investigation was conducted to find out a

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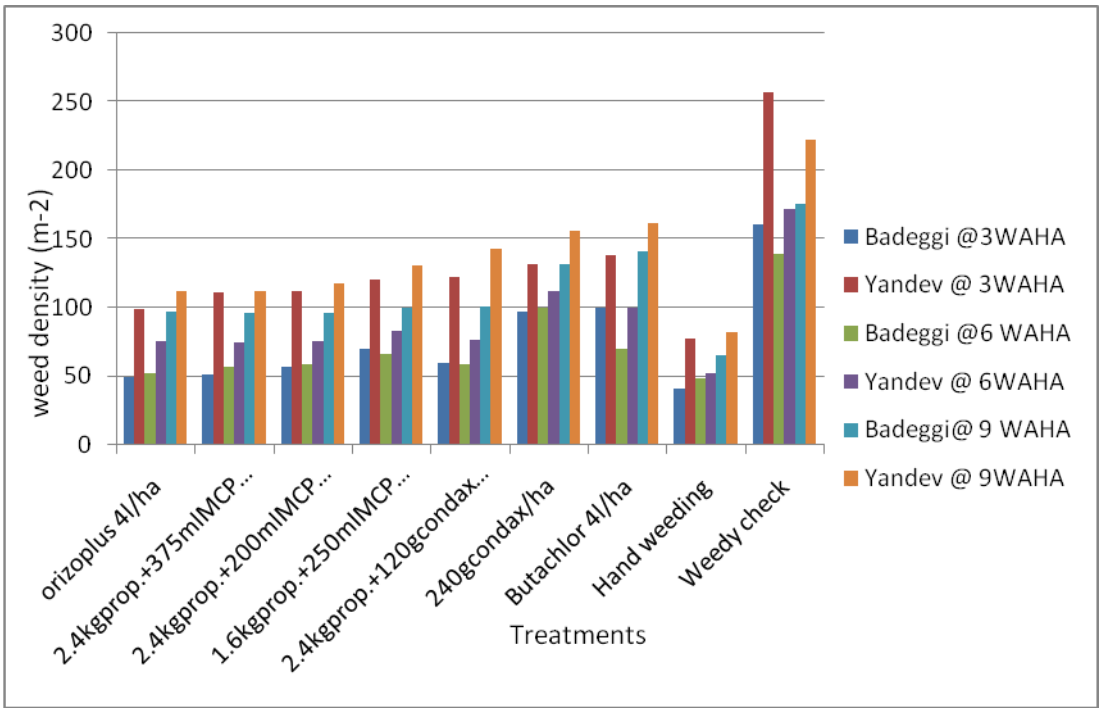
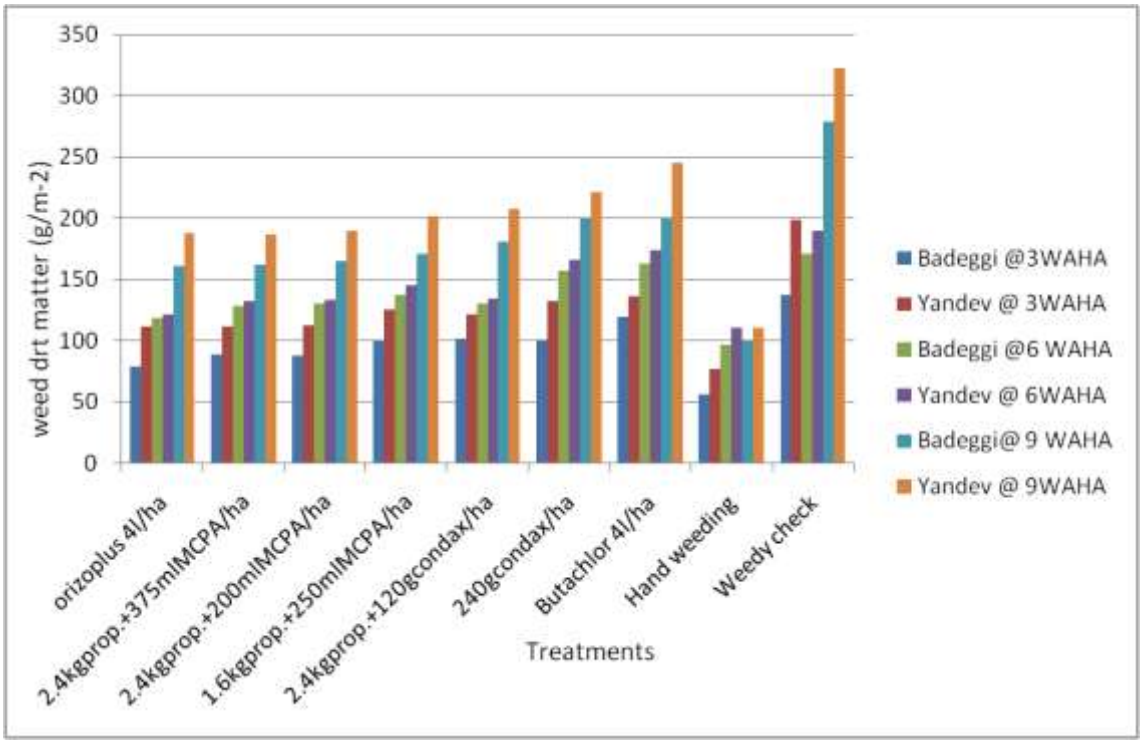
**Figure 1.** Effect of different herbicide formulations and rates on weed density ($m^{-2}$) at 3,6 and 9 weeks after herbicide application at Badeggi and Yandev.




@WAHA = At weeks after herbicide application.

**Figure 2.** Effect of different herbicide formulations and rates on weed dry matter ($g/m^{-2}$) at 3,6 and 9 weeks after herbicide application at Badeggi and Yandev.




@WAHA = At weeks after herbicide application.

**Figure 3**. weed control efficiency of different herbicide formulations and rates at Badeggi and Yandev.

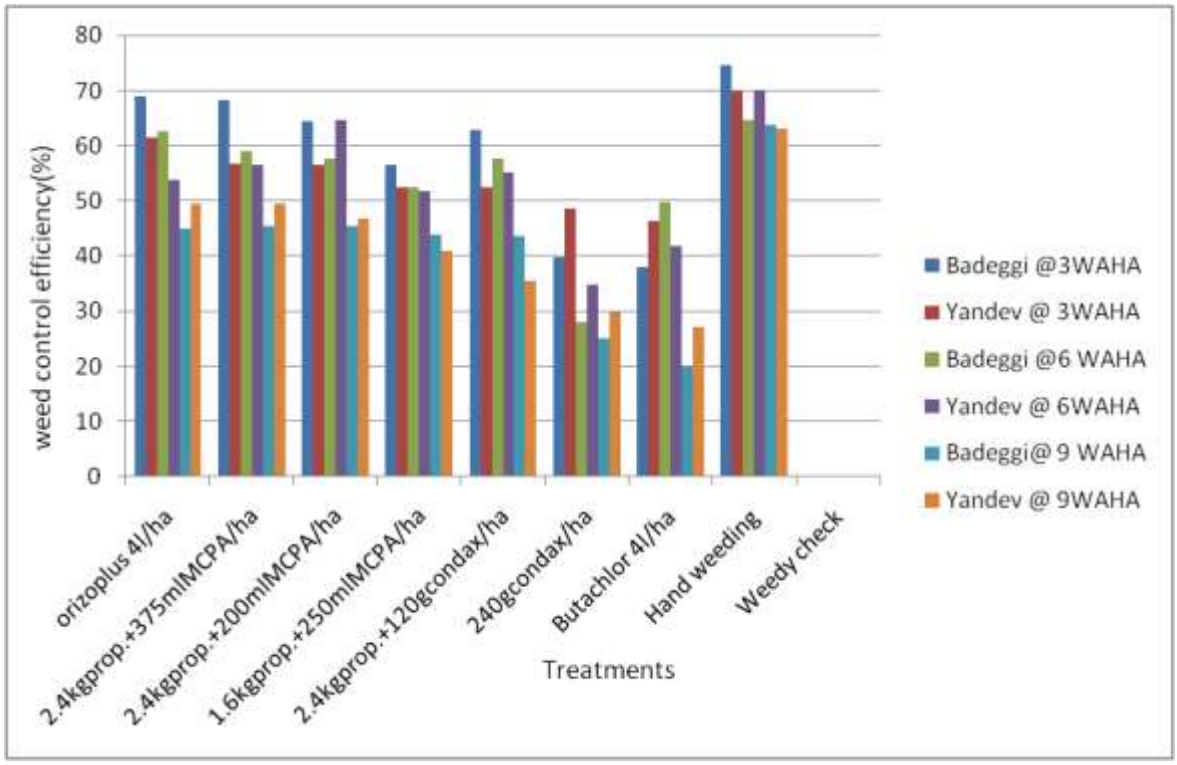
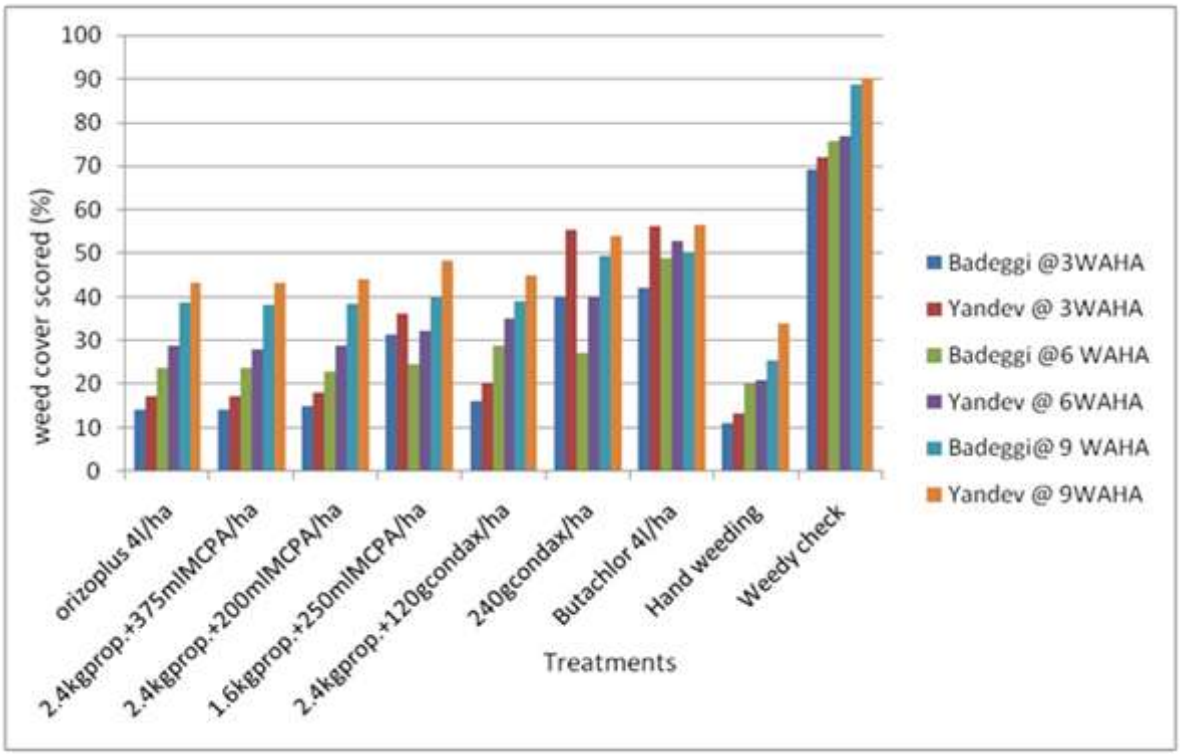



**Figure 4.** Effect of different herbicide formulations and rates on percentage weed cover scored at Badeggi and Yandev.




@WAHA = At weeks after herbicide application.

**Figure 5.** Phytotoxicity rating of different herbicide formulations and rates on rice plant at Badeggi and Yandev.

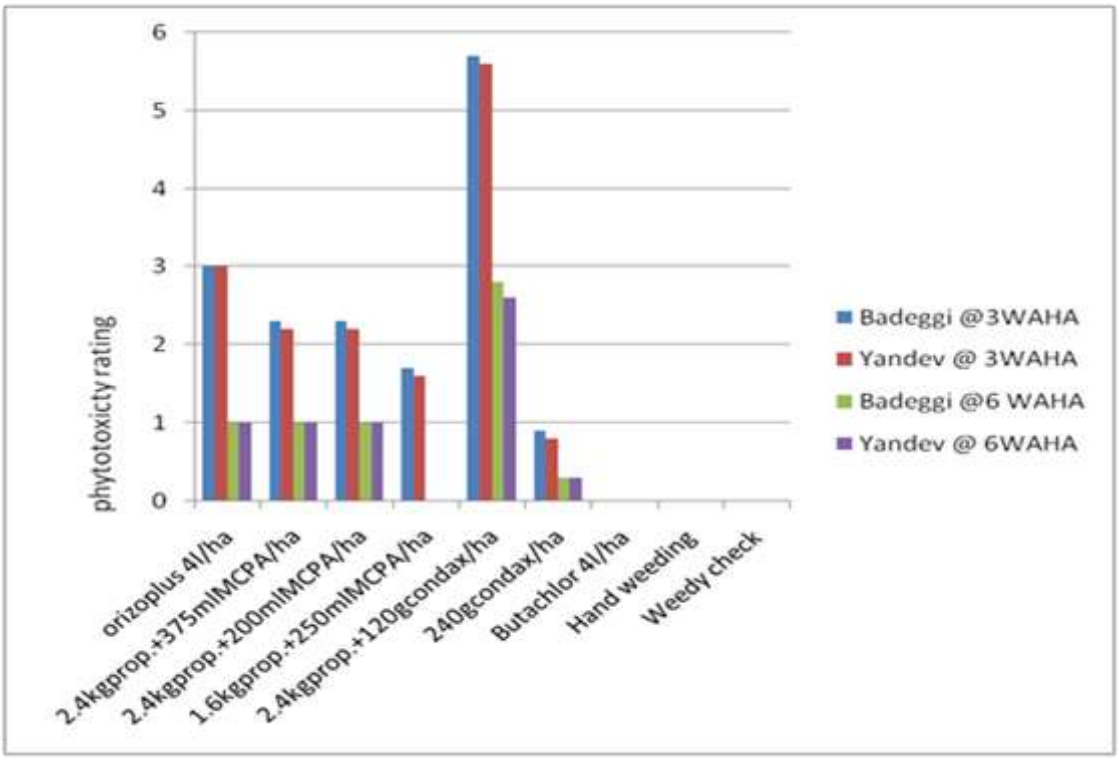



**Figure 6.** Effect of different herbicide formulations and rates on rice plant height (cm) at Badeggi and Yandev.

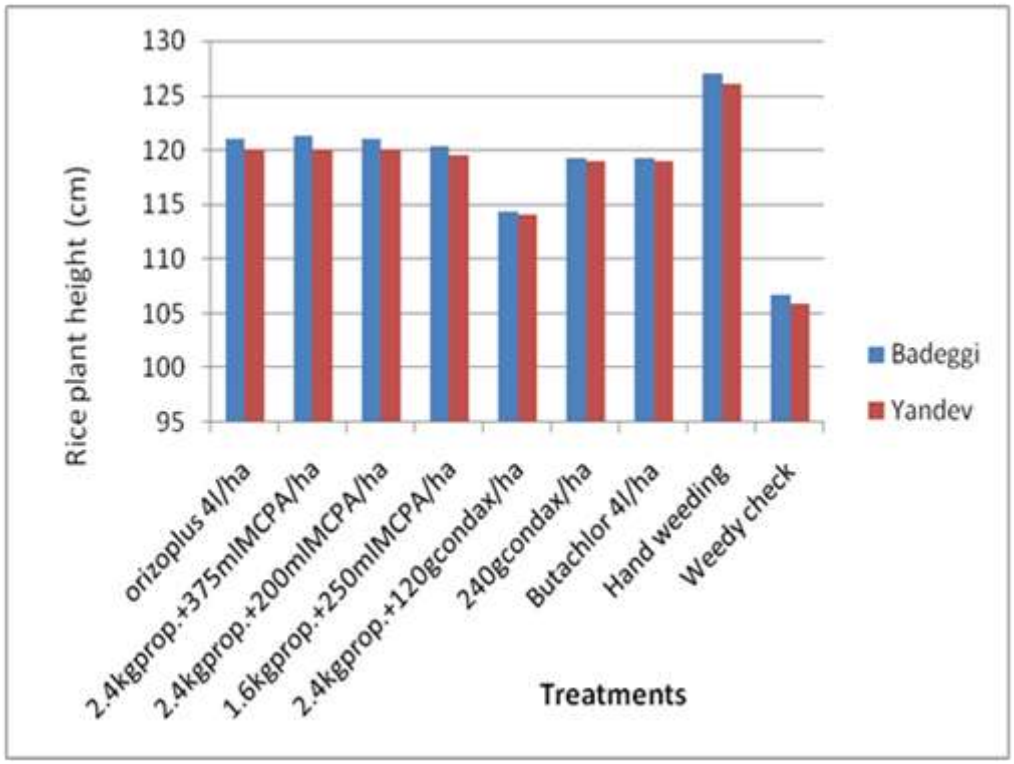


**Figure 7.** Effect of different herbicide formulations and rates on rice panicles ($m^2$) Badeggi and Yandev.

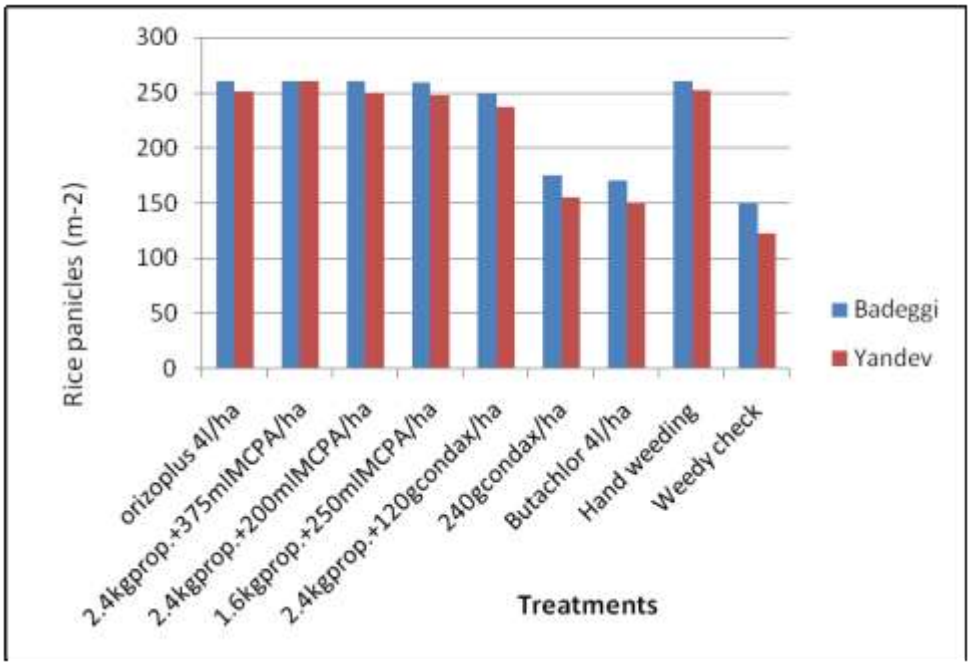
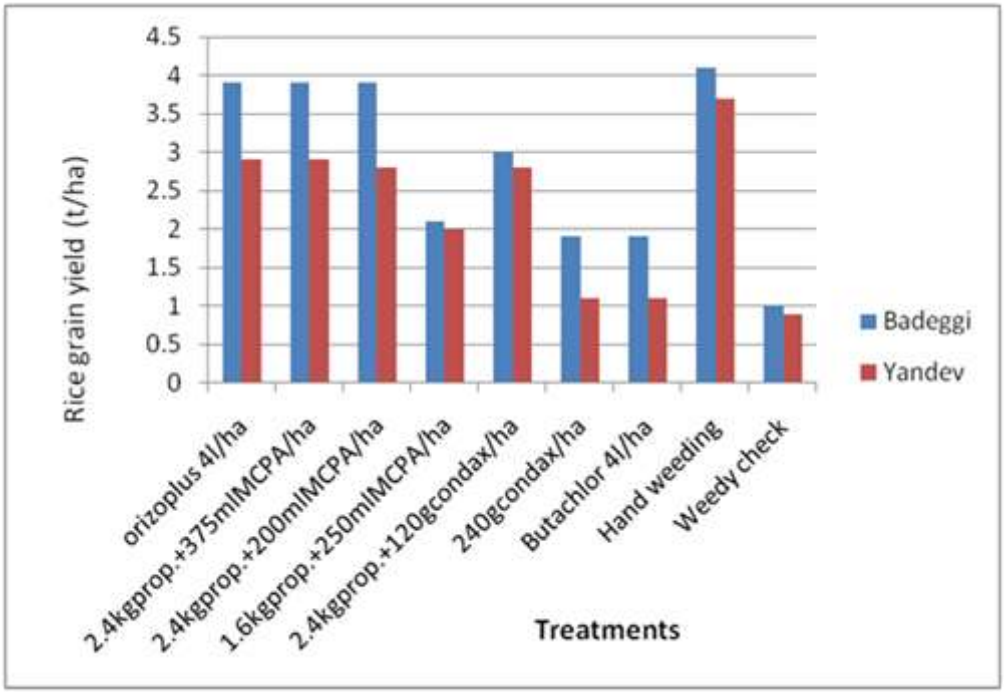



**Figure 8.** Effect of different herbicide formulations and rates on rice grain yield (t/ha) Badeggi and Yandev.




a selective broad spectrum herbicide for control of grasses, sedges and broad leaved weeds in a single spray in rice field as an alternative to the existing recommendation.

## MATERIALS AND METHODS

The field trial was conducted at Badeggi ($9^0$45'N, $60^0$7'E) and Yandev ($8^0$18$^0$, $7^0$20E) lowland fields during 2010 raining season. The experimental sites were ploughed and harrowed using tractor. The treatments were as follows: Orizo plus at 4 litres per hectare (as check), 2.4 kg propanil plus 375 ml MCPA /ha, 2.4 kg propanil plus 200 ml MCPA/ha, 2.4 k g propanil plus 120 g condax, applied at 3 weeks after planting, 1.6 kg propanil plus 250 ml/ha MCPA applied at 3 and 5 weeks after planting, 240 g condax per hectare applied at planting and 3 weeks after planting and Butaclor 4L/ha at planting. Other treatments included hand weeding at 3 and 6 weeks after planting and a weedy check as control. The trial was laid out in a Randomized Complete Block Design (RCBD) and replicated three times. The test rice variety was FARO 52. Data collected were weed density, weed dry matter, weed control efficiency (using the formula by Mani et. al (1973).

$$\text{Weed control efficiency (WCE)} = \frac{WD_C - WD_T}{WD_C} \times 100$$

Where,

$WD_C$ = Weed density (number/$m^2$) in control plot

$WD_T$ = Weed density (number/$m^2$) in treated plot.

Also phytotoxicity rating, numbers of panicles per meter square, plant height at harvest and rice grain yield per hectare were collected. All data collected were then subjected to statistical analysis and the means were compared using the least significant difference (LSD) at 5% significant level

## RESULTS

The application of 2.4 kg propanil plus 375 ml MCPA /ha, 2.4 kg propanil plus 200 ml MCPA/ha, 2.4 Kg propanil plus 120 g condax reduced both weed density and dry matter at all the sample periods in the two locations that were similar to application of Orizo plus at 4L/ha and comparable to hand weeding (figures 1 and 2). Weed control efficiency was higher with the application of 2.4 kg propanil plus 375 ml MCPA /ha and 2.4 kg propanil plus 200 ml MCPA /ha (figure 3) but were comparable to that obtained with application of Orizo plus and with two hand weedings. Throughout the periods of sampling and in both locations, Butachlor at 4L/ha produced the highest weed score among all the herbicide treated plots (figure 4). Phytotoxicity was higher only in 2.4 kg propanil plus 120 g Condax /ha treated plots (figure 5). The other rates of herbicides recorded minimal phytotoxicity. Rice plant height, rice panicle per meter square and rice grain were higher in plots treated with 2.4 kg propanil plus 375 ml MCPA /ha, 2.4 kg propanil plus 200 ml MCPA/ha, 2.4 kg propanil plus 200 ml MCPA/ha though that was similar to Orizo plus and two hand weeding plots (figures 6, 7 and 8).

## DISCUSSION

Weed density and dry matter were significantly affected by the application of formulated herbicide. The highest weed density and dry matter were recorded in weedy check. Application of different formulated herbicides showed differences in weed control. These results are corroborated with that reported by Rao (2005), and further supported by the work of Patel et al. (1985) and Rao and Moody (1988), who obtained a variable weed control in rice nurseries with the use of different herbicides. Weed control efficiency was higher at 3 weeks after herbicide application but reduced as the season progresses. This might be due to its ability to control only a portion of the weeds population at the earlier growth stage, this result agreed with the findings of (Mirza Hasanuzzaman et al., 2009). The yield of rice produced by the use of herbicides were comparable with the farmer's practices of two hand weedings except in Condax application at 240 g/ha and Butachlor at 4L/ha. This agreed with the work of Abeysekera, (2001) which showed that herbicides, when used in rice suppressed weed growth and increased the yield of rice.

## CONCLUSION

The application of Orizo plus at 4 L/ha and 2.4 kg propanil + 375 and 200 ml MCPA/ha provided more effective and season long weed control. The split application of 1.6 kg propanil +250 ml MCPA/ha and Butachlor at 4 L/ha were not effective on the weeds in this study. The application of Orizo plus at 4Lha and 2.4 kg propanil + 375 and 200 ml MCPA/ha which provided more effective and season long weed control should be adopted.

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