

Test of restoration of Guineo-sudanian pastures invaded by *chromolaena odorata* and *hyptis suaveolens* in Benin

Sinsin Brice¹, Kindomihou Valentin¹, Bako Idrissou², Saïdou Aliou¹, Houinato Marcel¹, Essou Jean-Pierre³

¹Laboratory of Applied Ecology, Faculty of Agronomic Sciences, vkindomihou@yahoo.fr; ²Project of Development of rooting plants, Ministry of Agriculture, Breeding and Fishings; ³Laboratory of Ecology, Faculty of Sciences, Abomey-Calavi University, Benin.

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Introduction *Chromolaena odorata* and *Hyptis suaveolens* are two cover plants invading pastures in Benin. They are essentially non-palatable, and were used as indicators for degraded grazinglands (Sinsin *et al.*, 1996abc). They constitute a major handicap to the pasture management in subequatorial zones (Holou & Sinsin, 2001) especially in the breeding ranches of Bétécoucou located between guineo-sudanian and sudano-Guinean climatic zones in Benin. Improving grassland phytomass productivities and nutrient value is important for successful herbivore breeding. In an attempt to rehabilitate pastures invaded by these species, we tested the use of the selective herbicide, Garlon 2E from CAMN Ste Armel (France), which contains trichlopyr (240 g/l) (1E= Trichlopyr 120g/l in form of salt of triethylamineand) as the active ingredient.

Plant materials, experiment and measurements Six types of pastures were used: (i) Pastures with *Andropogon schirensis* and *Hyparrhenia subplumosa* in shrubby savannas with *Terminalia macroptera*; (ii) Pastures with *Sporobolus pyramidalis* and *Hyparrhenia subplumosa* in shrubby fallow of *Daniellia oliveri*; (iii) Pastures with *Andropogon tectorum* and *Chromolaena odorata* in *Anogeissus leiocarpa* forest; (iv) Pastures with *Hyptis suaveolens* and *Hyparrhenia subplumosa* in *Isoblerlinia doka* forest; (v) Post-farming pastures with *Pennisetum polystachion* and *Securinega virosa* of fallows and (vi) Pastures with *Brachiaria falciifera* in valleys of *Acacia sieberiana*. Treated pastures were selected based on *Chromolaena* and *Hyptis* weed cover rates. The experimental design was a Fisher block with 4 treatments in 3 replications on plots sized 10 m x 10 m in 50 m x 50 m area within the pasture with *A. tectorum* and *C. odorata* and in pasture with *H. suaveolens* and *H. subplumosa*. Following treatments were applied: (i) 1 application of 1 L of Garlon/25 L of water per ha; (ii) 2 applications of 1 L/25 L of water per ha every 30 days for *Chromolaena odorata* and every 45 days for *Hyptis suaveolens*; (iii) 1 application of 1 L of Garlon/100 L of water per ha; (iv) 2 applications of 1 L of Garlon/100 L of water per ha every 30 days for *Chromolaena odorata* and every 45 days for *Hyptis suaveolens*. Weed cover rates were estimated every three months for one year (2004-2005). Morphological traits i.e. heights of clumps, leaf blades length, width, and leaf area were also recorded. ANOVA and Post hoc test were performed using STATISTICA 7.0.

Results and discussion No significant difference appeared with pastures. Data analyses indicated (i) the single application of 1 L of Garlon 2E/100 water L per ha eliminated *Chromolaena odorata* where ever its pre-treatment cover rate was less than 15%; (ii) 2 applications of 1 L of Garlon 2E/100 L of water per ha every 30 days were effective where cover rate ranged from 15 to 35%; (iii) application of 1 L of Garlon 2E/25 L of water per ha (i.e., a concentrated application) followed by application of 1 L of Garlon 2E/100 L of water per ha (i.e., a economical application) was effective where cover rate ranged from 35 to 80%; (iv) 2 applications of 1 L of Garlon 2E/ 25 L of water per ha every 45 days are effective where cover rate ranged from 80 to 100%. The product effectiveness depends on the covering rate. Applying the economic amount consecutively to the concentrated one after 30 days could be suitable. For pastures mostly invaded by *C. odorata* (weed cover > 80%), 2 consecutive applications of concentrated amounts every 45 days appeared to be suitable. These results corroborated previous from Lavabre (1988) on the pastures invaded by *C. odorata* and treated by glyphosate (Roundup), trichlopyr (Garlon) or imazapyr (Arsenal) both effective. Biological control was not conclusive except with *Parenchaetes sp.* in Sri Lanka, but *Cercospora eupatorii* was effective with a closer species to *C. odorata* (Lavabre 1988). For *H. suaveolens*, results were strong at 1L of Garlon 2E by 50 water L per ha. Two consecutive applications every 45 days are suitable. A consistent control requires replication in the 2nd year. Consecutive applications of 1L of Garlon 2E/100LH₂O/ha every 30 days might be suitable. Otherwise, *H. suaveolens* controls food crops (i.e. beans) enemies (Sinsin *et al.* 1996).

References

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