

Research Application Summary

The role of weed management in reducing postharvest deterioration of taro in Cameroon

Lum, A. F.¹ & Ayongwa, G. C.²

¹Department of Agronomic and Applied Molecular Sciences, Faculty of Agriculture and Veterinary Medicine, University of Buea, P. O. Box 63, South West Province, Buea, Cameroon

²University of Bamenda, P.O.Box 39, Bambili,, Bamenda, Cameroon

Corresponding author: Lumfontem@yahoo.com

Abstract

Weeds are a severe constraint to crop production in the tropics. A field experiment was conducted in the Teaching and Research Farm of the University of Buea in 2015. The objective of the study was to assess the contribution of weeds to postharvest losses in taro (*Colocasia esculenta* L. Schott). The treatments were weed-free and weed-infested plots. After harvesting, the taro corms and cormels were stored for one month on floor made of earth. The yield of corms and cormels obtained from the weed-free treatment was 89.5% more than that from the weed-infested plots. At five days after storage, 100% of the corms and cormels from the weed-infested plots were all rotten while only 3% of corms from the weed-free plots had spots. After one month of storage, 50% of the corms from the weed-free plots had spots while none of the cormels from the same plot was affected. The taro corms and cormels obtained from the weed-infested plots had a high disease incidence and were of low quality (grade) compared to those from the weed-free plots. This study therefore, demonstrates the importance of weed management as a key preharvest (agronomic) practice that can be deployed to prevent drastic reduction of postharvest losses in taro production.

Key words: Cameroon, *Colocasia esculenta*, postharvest loss, taro, weeds

Résumé

Les mauvaises herbes représentent un grave danger pour la production agricole sous les tropiques. Une expérience sur le terrain a été menée en 2015 dans un champ d'expérimentation de l'Université de Buéa. Elle avait pour objectif d'évaluer l'incidence des mauvaises herbes dans les pertes post-récolte du taro (*Colocasia esculenta* L. Schott). Les traitements ont été effectués dans une parcelle sans mauvaises herbes et dans une autre couverte de mauvaises herbes. Après la récolte, les cormus et petits tubercules latéraux ont été conservés pendant un mois sur le sol en terre. Le rendement des cormus et de petits tubercules latéraux dans la parcelle désherbée était de 89,5% supérieur à celui de la parcelle couverte de mauvaises herbes. Après 5 jours de conservation, 100% de cormus et de petits tubercules latéraux de la parcelle couverte de mauvaises herbes étaient complètement pourris, alors que 3% seulement de cormus de la parcelle désherbée portaient des taches. Après un mois de conservation, 50% de cormus de la parcelle désherbée portaient des taches et aucun petit tubercule latéral de cette même parcelle n'était touché. Les cormus et petits tubercules latéraux récoltés dans la parcelle couverte de mauvaises herbes avaient une plus grande incidence des maladies et étaient de loin de moindre qualité que ceux de la

parcelle désherbée. Par conséquent, de bonnes pratiques de gestion des mauvaises herbes peuvent être un début de solution pour réduire de manière significative les pertes post-récolte enregistrées dans la production du taro.

Mots clés: Cameroon, *Colocasia esculenta*, perte post-récolte, taro, mauvaises herbes

Background

Postharvest losses are very high in the developing world. Reliable statistics on losses are limited (FAO, 1981). Estimates of production losses in developing countries are hard to determine but some authorities put losses of crops like sweet potato, plantain, tomato, banana and citrus fruits to as high as 80% or half of what is grown (FAO, 1989). Losses ranging from 30 to 80% have also been reported, depending on the commodity (Kitinoja *et al.*, 2011). Most of the losses tend to occur between the grower and the market, rather than at the consumer level (Kader, 2010). Reduction in wastage would be of great significance to growers and consumers alike. It is therefore important to maintain the quality of crops from production till when they are ready for consumption. An effective method to reduce postharvest losses will involve the use of appropriate crop production practices such as weed management. Pre-harvest production practices such as water supply, soil fertility and or use of fertilisers and cultivation practices (including weed management) may seriously affect post-harvest returns in quality and quantity (FAO, 1989). These may result in rejection or downgrading of produce at the time of sale and therefore, loss in income by farmers or producers.

Weeds are serious crop pests that cause significant reduction in the quality and quantity of harvested products in the tropics. More than 50% yield losses have been reported in some crops (Chikoye *et al.*, 2000). Some weed species serve as alternate hosts for many bacterial and fungal diseases that affect crops. The presence of weeds increases the moisture level in the field thereby facilitating the rotting of produce. Taro (*Colocasia esculenta* L. Schott) is an important staple crop for millions of people in developing countries. Its production is severely constrained by the leaf blight disease caused by *Phytophthora colocasiae*. The disease reduces corm yield by 50% (Singh *et al.*, 2006), leaf yield by 95% and causes postharvest bio-deterioration of corms. The use of appropriate cultural and weed management practices could improve on the yield and quality of taro. The objective of this study was to assess the contribution of weeds as pre-harvest factors, to postharvest losses of taro.

Study description

Field procedure. The field experiment was conducted in the Teaching and Research Farm of the University of Buea, in the South West Region of Cameroon during the 2015 cropping season. The major weed species at the site were *Panicum maximum* and *Ageratum conyzoides*. The land was prepared by tractor ploughing and plots were formed manually using a hoe. Each plot consisted of 5 rows, 4m long with 0.6m spacing between plants within the row. The spacing between the plots was 1m. Healthy cormels of uniform sizes were planted at the beginning of the rainy season in March 2015.. The experimental design was a randomized complete block with three replications. The treatments were plots kept weed-free throughout the season and an unweeded check. The weed-free plots were hoe-weeded once every month. The corms and cormels were harvested six months after planting from the centre rows of each plot and weighed to obtain the yield. The corms and cormels were visually assessed for disease symptoms using standard procedures described in Bock and Nutter (2011).

Storage procedure. The corms and cormels from the different treatments were stored by spreading them on floor made of earth for one month. They were visually assessed for disease symptoms using scores given in Bock and Nutter (2011) and the number of diseased corms and cormels were counted at 5 and 30 days after storage.

Results and discussion

The study revealed the potential of weeds to increase postharvest losses in taro. Taro yield in the weed-free plots was 89.5% more than that in the weed-infested plots (Fig. 1). However, this was not surprising because there was weed interference which might have caused severe competition for growth factors between the weeds and the taro plants in the weed-infested plots. This is similar to observations from previous studies that reported reductions in crop yield due to weed interference (Chikoye *et al.*, 2000; Lum *et al.*, 2005). Lack of weeding also resulted in very poor quality corms and cormels with diseased spots and bruises or rotten. In contrast, 3% of the corms from the weed-free plots had disease symptoms while none of the cormels had any signs of disease infection.

At five days after storage, 100% of the corms and cormels from the weed-infested plots were completely rotten. On the other hand only 3% of corms from the weed-free plots had spots while 100% of the cormels were disease-free. At 30 days after storage, 50% of the corms from the weed-free plots were diseased while none of the cormels was affected. It is possible that the weeds could have bruised the corms and cormels, and the moisture in these plots facilitated rotting from the field and they could therefore not survive when stored.

These preliminary findings show that weeds contributed to 89.5% yield losses in taro corms and cormels. Also, taro corms and cormels obtained from the weed-infested plots had very poor quality and could not be stored for up to a week compared to those from the weed-free plots that were still healthy 30 days after storage. Therefore, weed management is a key factor in the reduction of postharvest losses in taro production.

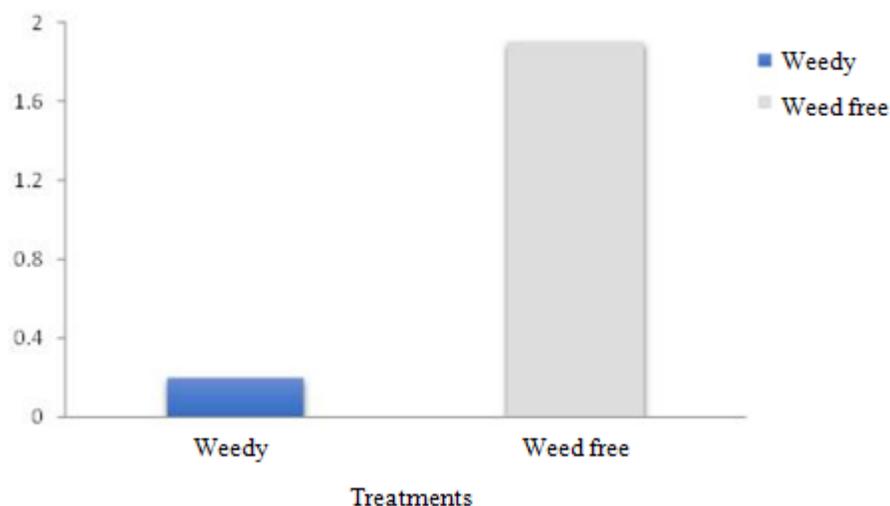


Figure 1. Effect of weeds on the yield of taro in Buea, Cameroon

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