Research Note

HEAD CABBAGE VARIETY STUDY FOR TIPBURN RESISTANCE

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In head cabbage, tipburn symptoms are concealed within the head. Tipburn refers to a brownish discoloration of the tips of leavesof head cabbage, Chinese cabbage and lettuce (Collier & Tibbitts 1982). In Northern Guam, severe symptoms of head cabbage tipburn were reported on "K-K cross" with subsequent economic losses in the past fifteen years (Cruz *et al.* 1987).

Mechanism by which tipburn occurs is not well understood. The occurrence of tipburn is attributed to several factors including calcium related disorder (Collier & Tibbits 1982). ammonium toxicity (Imai 1987) and salinity (Feigin *et al.* 1991). Today, more and more commercial seed companies are producing tipburn resistant varieties of head cabbage. The purpose of this study is to compare tipburn symptoms in four head cabbage varieties, grown to mature size (90 days) under Northern Guam soil conditions.

A field experiment was conducted at the Yigo Agricultural Experiment Station. Soil characteristics are classified as clayey, gibbsitic isohperthemic, Tropeptic Eutrustox very shallow, highly clacarious with limited moisture holding capacity. The experimental design consisted of 4 main plots with 4 subplots of 4 head cabbage varieties each: Scorpio, Pacifica, K-K Cross and Blue Vantage. Seedlings were transplanted on 30 m row irrigated with a double drip line of 30 cm spacing between plants and 1.5 m between rows. A basal fertilizer dressing with 10-20-20 was applied at a rate of 1.8 Kg/30 m (each row length) three days prior to transplanting. Fertilization was carried out every other week with 10-20-20 injected at a rate of 25g/100 litter of water. On one side of the experimental field (down wind side), one row each of Chinese cabbage, radish and Indian mustard control. Dibrom 8 emulsive (10 ml/L) was sprayed when needed to control the cutworm *Spodoptera litura*. Dipel (mm/L) was additionally used as needed to control diamondback moth.

A total of 160 cabbage heads (10 per variety for each row on all plots) were randomly harvested at 90 days, individually weighed, split longitudinally and assigned a tipburn score. Width and length of the longitudinal cross section were also measured. Incidence of tipburn was given a score after observing 5 consecutive leaves after the first leaf. No leaf showing discoloration is rated 0 while discolorationon all five leaves is rated 5. Data were analyzed using GLM procedure and LSD pairwise comparisons (SYSTAT 1992).

Table 1. *Incidence of tipburn, head cabbage weight, longitudinal cross section length and width of 4 varieties of cabbage.*

Variety	Tipburn (0 to 5)	Weight (g)	Length (cm)	Width (cm)
Scorpio	0.3[a]	1529[b]	13.35[c]	11.88[b]
Pacifica	0.3[a]	1339[a]	12.31[b]	11.12[a]
K-K Cross	1.7[b]	1507[ab]	11.76[a]	12.83[c]
Blue Vantage	2.8[c]	1503[ab]	13.05[c]	11.80[b]

[ab] *Mean values in each colomn with a different superscript are significantly different (P<.05).*

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Table 1 shows the incidence of tipburn, head cabbage weight, longitudinal cross section length and width on 4 varieties of head cabbage. Results indicated that varieties Scorpio and Pacifica showed resistance to tipburn while varieties K-K Cross and Blue Vantage showed high susceptibility to tipburn. These findings confirm the label of Scorpio as a tipburn resistant head cabbage but contrast with the claim that Blue Vantage is tipburn resistant. Previous studies (Cruz *et al.* 1997) reported high susceptibility of K-K Cross towards tipburn and it is confirmed by this study. Pracifica variety is known to be heat tolerant and resistant to Cabbage Yellows, and displayed a good resistance to tipburn under these experimental conditions. When weight, length and width are compared between tipburn resistant varieties, Scorpio scored significantly ($P < .05$) higher for weight, length and width as compared to Pacifica.

Based on these preliminary studies, the head cabbage variety Scorpio is a good choice for Guam as it exhibits resistance to tipburn, and desirable marketing traits such as longer and wider appearance of the head. In addition, Scorpio has indicated partial resistance to dismondback moth attack (Cruz *et al.* 1997). More field studies including yield and other economical parameters need to be evaluated in order to recommend varieties better suited for Guam.

ACKNOWLEDGEMENT

Funding for this study was provided by the Hatch Poject, GU00103.

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