



Basil Variety Trial: Beetle Susceptibility, Flowering and Internode Traits

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Introduction

Sweet basil (*Ocimum basilicum*) is a high-value herb (Year 2019= \$28 million, HDOA) that is grown year-round in Hawai'i and primarily exported to the continental US and Canada. Within recent years, varietal research has been conducted to evaluate resistance to diseases such as basil downy mildew (*Peronospora belbahrii*). However, anecdotal observations also indicated susceptibility of certain varieties to damage from flower and rose beetles (Fig 1). A variety trial was conducted to investigate this further, as well as measure other agronomic traits like flowering percentage, internode length, and yield that are important for production and marketability.



Figure 1: Beetle damage on basil

Varieties Evaluated

| Name | Additional Traits | Suppliers |
|-----------|--|------------------------|
| Eleonora | Intermediate downy mildew resistance | Corona Seeds |
| Everleaf | Intermediate downy mildew resistance; Compact growth | Enza Zaden* |
| Fiona | Intermediate downy mildew resistance | Harris Seeds* |
| Obsession | Downy mildew resistance; Compact growth | High Mowing Seeds* |
| Prospera | Downy mildew resistance; Fusarium resistance | Johnny's Seed* |
| | | NE Seed |
| | | Stokes Seeds |
| | | VDF Specialty Seeds |
| | | Vitalis Organic Seeds* |

*Indicates organic seed available

Methods

Planting, Data Collection

- Location: Waimanalo Research Station, O'ahu
- Four single-row plots per variety (4ft between centers); Four plants per row (2ft apart)
- Beetle damage, yield, internode length and flowering percentage assessed 2 months after transplanting on October 1, 2020
- Five representative 6 inch-long, mature stems from each plant were harvested to assess yield
- Internode length assessed for two nodes above cut
- Data analyzed using ANOVA with LSD All-Pairwise Comparison Test

Table 1. Scale for Beetle Damage, Flowering Percentage Scores

| Scores | | |
|--------|--------------------------------|----------------------------|
| Value | % of Leaves with Beetle Damage | % of Branches with Flowers |
| 0 | None | None |
| 1 | 1-25 | 1-25 |
| 2 | 26-50 | 26-50 |
| 3 | 51-75 | 51-75 |
| 4 | 76-100 | 76-100 |



Results & Discussion

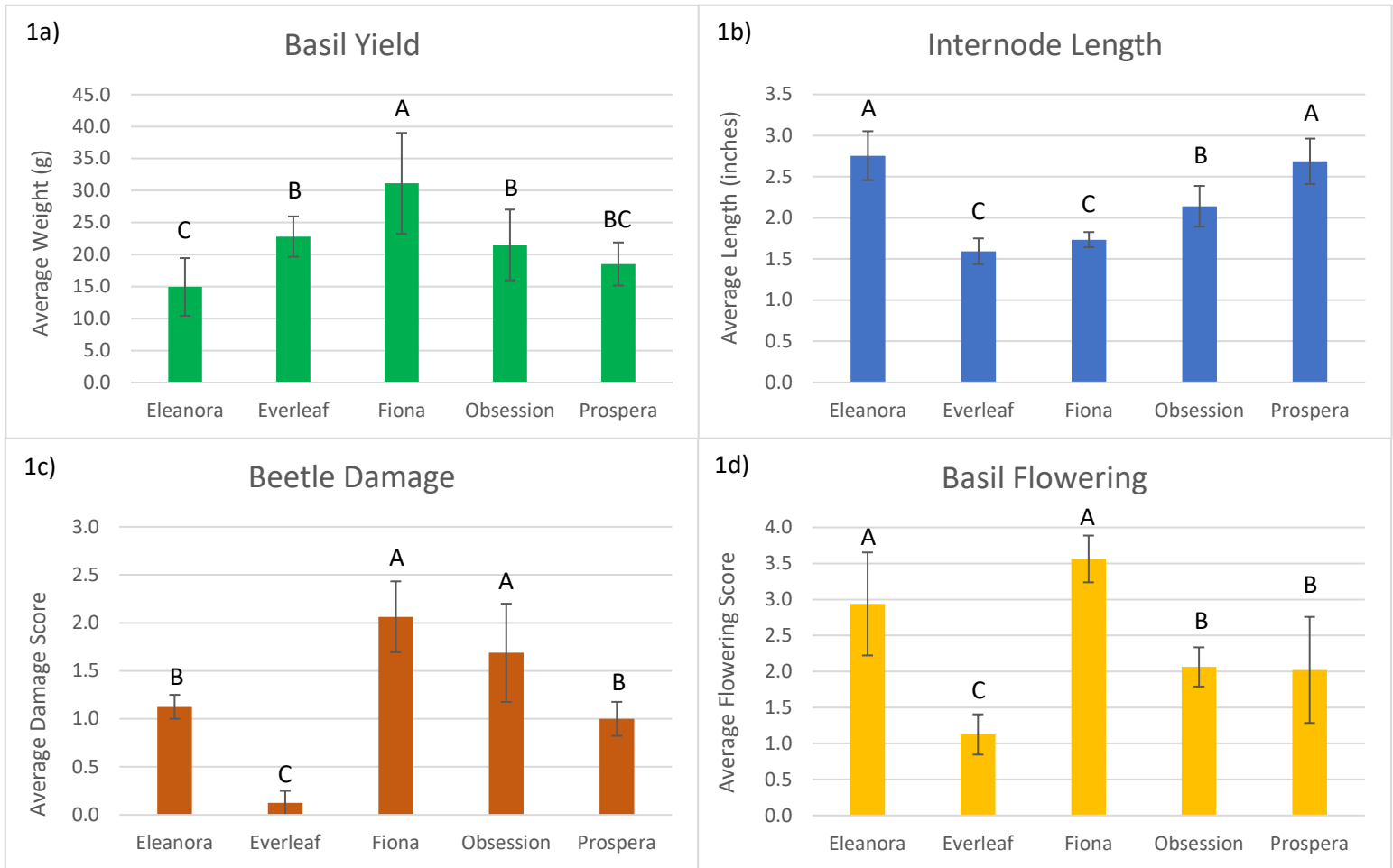


Figure 2: Harvest results of five basil varieties for a) beetle damage, b) flowering %, c) yield, and d) internode length
 *Varieties not sharing a letter were significantly different

Of the varieties evaluated, Fiona basil yielded the statistically heaviest stems, followed closely by Everleaf, Obsession, and to some extent Prospera (Fig 2a). Fiona, Everleaf, and Obsession varieties also had the shortest internode length when harvested (Fig 2b), which suggests these varieties may be less prone to falling over during production compared to varieties with longer internodes. Varieties with shorter internode lengths, in addition to other factors like short height and higher, compact branching, may also be better suited towards potted production (Walters 2015).

Although Fiona and Obsession varieties had desirable yield and internode traits, these varieties were statistically more susceptible to beetle damage (Fig 2c), with nearly 50% of leaves being damaged on some stems. Fiona along with Eleanora also exhibited the highest degree of flowering (Fig 2d), which is undesirable for production, labor, and marketability. Interestingly, the Everleaf variety was the least susceptible to beetles, exhibiting nearly zero damage among the 4 replications, and Everleaf also had the lowest flowering degree. Prospera was moderate in terms of beetle damage and flowering.



Conclusion

Considering the four traits measured, the Everleaf performed the best with moderately high yields, short internode length, and exceptionally low beetle damage and flowering. Also given its compact size and branching, Everleaf has good potential for potted production and possibly certain culinary trends with its unique compact shape. However, as found in a previous trial (Silva et al. 2018), Everleaf is susceptible to basil downy mildew strains found in Hawaii so would need to be managed for that disease during cool and wet seasons using spacing, sanitation, and rotational spraying. Obsession and Prospera varieties performed moderately well in this trial, and also exhibited good resistance to basil downy mildew in a previous trial (Silva 2020), but both varieties exhibited more beetle damage and flowering than the Everleaf variety. If selecting these varieties, beetle damage would need to be managed utilizing appropriate integrated pest management practices, such as screen exclusion or an effective pesticide, while flowering would need management through labor and plucking.

References

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Eleanora



Everleaf



Fiona



Obsession



Prospera