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Screening of chrysanthemum variety against *Bemisia tabaci*, (Gennadius) under polyhouse condition

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Abstract
An experiment in which six chrysanthemum genotypes were evaluated to assess their reaction against chrysanthemum whitefly, *Bemisia tabaci* (Gennadius), under polyhouse conditions during 2025. None of the evaluated genotypes were found completely free from whitefly infestation. Significant variation was observed among the genotypes with respect to whitefly nymph and adult population. Among the tested genotypes, Bidhan Gol recorded the lowest whitefly population, indicating its comparatively tolerant reaction against whitefly infestation. And it was followed by Bidhan Agnidev, Denti White, and Sunil, which also exhibited comparatively lower infestation and remained statistically at par with one another. In contrast, Ratlam Selection showed a moderate level of infestation, whereas the highest whitefly population was observed in Ajina Purple, indicating its comparatively greater susceptibility to whitefly infestation.

Keywords: Chrysanthemum, screening, whitefly, polyhouse

Introduction

Flowers are Nature's most valuable gifts and play an essential role in human life connected festivals, celebrations, religious offerings, auspicious occasion and many more social ceremonies and rituals. In India agrarian system has traditionally focused mainly on achieving food and nutritional security through self-sufficiency in food grains and horticultural crops. Floriculture sector, has gained importance, aiming to achieve aesthetic self-sufficiency. Commercial floriculture development is associated with urbanization and accelerated income level. The word chrysanthemum is derived from the Greek words 'Chrysos' (gold) and 'Anthemon' or 'Anthos' (flower). It belongs to the Asteraceae family (Anderson, 1987) [1]. It is known as ‘Queen of East’, ‘Glory of the East’, ‘Guldaudi', and ‘Autumn Queen’ Chrysanthemum ranks second to rose amongst top ten cut flowers in the world trade of flower crops preferred particularly for its range of shapes and size of flower, brilliant color tones and long-lasting shelf life of flower (Brahma, 2002) [2]. It is believed to be native to the Northern hemisphere, specifically Europe and Asia. It is originated in China (Bose *et al*. 2002) [3].

Chrysanthemum plants have been shown to reduce indoor air pollution as given by NASA clean air study (Zang *et al.*, 2019). In India it has been recognized as one of the five commercially important flower crops (Janakiram *et.al.*, 2006) [4]. It contributes significantly to the global flower trade and horticultural GDP due to its high medicinal, ornamental, and floricultural value. The number of varieties in the world is reported to be above 2000, in India, there are about 1000 varieties are in existence which include exotic as well as indigenously developed in our country (Joshi *et al*, 2009) [5].

Among the all the causes related with yield and quality of chrysanthemum flower, resistant variety of chrysanthemum plays an enormous role. Therefore, detailed information on varietal susceptibility of chrysanthemum, is essential for effective whitefly management.

Materials and Methods

The experiment was carried out to screen different varieties of chrysanthemum against whitefly, *Bemisia tabaci*, under polyhouse conditions at the Main Sugarcane Research Station, N. M. College of Agriculture, Navsari Agricultural University, Navsari, Gujarat during the year 2025. It was conducted with six varieties (Treatments) and five repetitions to evaluating the relative susceptibility or resistance of various chrysanthemum varieties to whitefly infestation under protected cultivation. Standard agronomic practices were followed throughout the experimental period to ensure uniform crop growth and development. Observations on whitefly incidence were recorded for each chrysanthemum variety (Treatment) throughout the experimental period. For this purpose, three leaves per plant were selected, representing the top, middle, and bottom canopy levels to obtain a comprehensive assessment of infestation across different plant strata. The number of whitefly nymphs and adults present on each selected leaf was carefully counted and recorded at regular intervals. The collected data were used to evaluate the relative population density of whitefly on different varieties. Based on the mean population of number nymph’s whitefly recorded, the varieties were categorized into resistant and susceptible groups. This classification was carried out to identify comparatively tolerant varieties on the basis of number of whiteflies per three leaves under polyhouse conditions.

Results and Discussion

Screening of crop varieties plays a crucial role in identifying inherent levels of susceptibility or resistance against insect pests, Evaluation based on pest population dynamics provides a reliable measure for differentiating resistant and susceptible varieties

The data presented in Table 1 and Figure 1 clearly indicated that none of the evaluated varieties were found to be free from whitefly infestation. The presence of the pest was recorded across all varieties, though the number of nymph and adults from three leaves per plant suggesting differential response among the tested varieties.

The observations on number of adults and nymphs of *Bemisia tabaci* across six chrysanthemum variety from day of infestation to four weeks after infestation (WAI) indicated that number of nymph and adult whiteflies exhibit high mobility and active dispersal among plants for feeding and oviposition. This behavior reflects a strong host-selection process influenced by cultivar-specific traits, leading to differential colonization and egg laying on preferred hosts. Such mobility-driven redistribution suggests that early population establishment in *B. tabaci* is governed by host preference and plant suitability, which ultimately shapes subsequent population development on chrysanthemum vareities. Among the six chrysanthemum varieties tested, none remained free from whitefly infestation, indicating that all cultivars were susceptible to *Bemisia tabaci* colonization to some extent.

Response of chrysanthemum varieties against whitefly nymphs (*B. tabaci*)

One week After initiation of infestation (1 WAI)

Significant variation was observed among the evaluated chrysanthemum varieties with respect to whitefly nymphal incidence at one week after infestation (WAI). Among the tested varieties, Denti White and Sunil recorded the lowest nymphal population (0.00 nymphs per three leaves each), followed by Bidhan Agnidev and Bidhan Gol with 0.02 and 0.08 nymphs per three leaves, respectively. These varieties were found to be statistically at par with one another, indicating their comparatively tolerant reaction against whitefly infestation. In contrast, Ratlam Selection exhibited a comparatively higher nymphal population (0.24 nymphs per three leaves), while the highest incidence was recorded in Ajina Purple (0.48 nymphs per three leaves), indicating its greater susceptibility to whitefly infestation.

Two weeks after initiation of whitefly infestation (2 WAI)

Two weeks after infestation of whitefly indicating that variety, Bidhan Gol recorded the lowest nymphal population (0.20 nymphs per three leaves), followed by Denti White and Sunil, which registered 0.56 and 0.51 nymphs per three leaves, respectively. These varieties were found to be statistically at par with each other, whereas the highest nymphal population was recorded in Ajina Purple (5.28 nymphs per three leaves), indicating its comparatively greater susceptibility to whitefly infestation.

Three weeks After initiation of whitefly infestation (3 WAI)

A statistically significant variation in whitefly nymph population was observed among the chrysanthemum varieties indicating differential responses of the varieties towards whitefly infestation. Among the evaluated varieties Bidhan Gol recorded the lowest nymphal population (1.24 nymphs per three leaves). In contrast, Ratlam Selection exhibited a moderate level of infestation with 4.36 nymphs per three leaves, whereas the highest nymphal population was recorded in Ajina Purple (7.20 nymphs per three leaves), reflecting its comparatively greater susceptibility to whitefly infestation.

Table 1: Performance of chrysanthemum variety against whitefly nymph (*Bemisia tabaci*)

Tr. No.	Variety	Mean number of whitefly nymph per three leaves				Pooled over mean
		1 WAI	2WAI	3WAI	4WAI	
T1	Ajina Purple	0.98^{c} (0.48)	2.40^{e} (5.28)	2.77^{e} (7.20)	2.95^{e} (8.24)	2.14 (5.30)
T2	Bidhan Gol	0.75^{a} (0.08)	0.83^{a} (0.20)	1.31^{a} (1.24)	1.40^{a} (1.37)	0.93 (0.73)
T3	Ratlam Selection	0.85^{b} (0.24)	1.69^{d} (2.36)	2.20^{d} (4.36)	2.57^{d} (6.12)	1.61 (3.27)
T4	Bidhan Agnidev	0.72^{a} (0.02)	1.08^{c} (0.68)	1.38^{ba} (1.41)	1.50^{b} (1.76)	1.06 (0.96)
T5	Denti White	0.70^{a} (0.00)	1.02^{b} (0.56)	1.49^{c} (1.72)	1.72^{c} (2.48)	1.06 (1.19)
T6	Sunil	0.70^{a} (0.00)	1.00^{b} (0.51)	1.44^{cb} (1.60)	1.59^{b} (2.04)	1.03 (1.03)
	SEm (±)	0.02	0.03	0.03	0.04	
	C. D. at 5%	0.05	0.10	0.09	0.10	
	CV	5.31	5.72	3.99	4.04	

*Figures in parentheses are original values and those outside are square root transformed values. In each column means followed by the same alphabet are statistically at par with each other DNMRT has been used. WAI: Weeks After Infestation

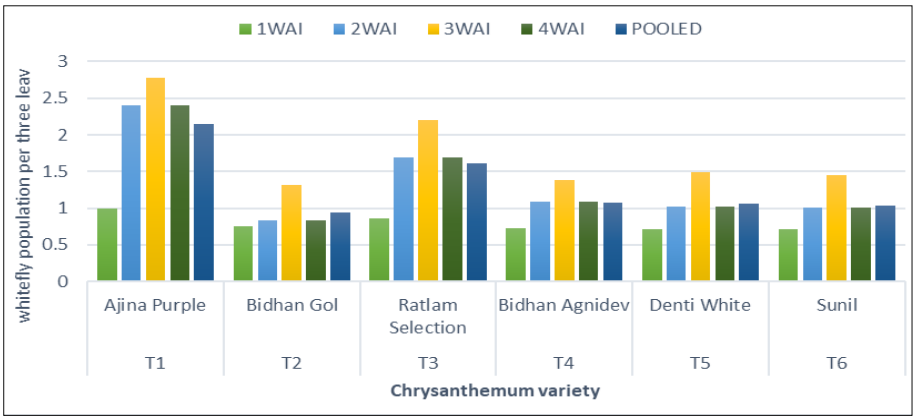

Fig 1: Performance of chrysanthemum variety against whitefly nymph (*Bemisia tabaci*)

Four weeks after initiation of whitefly infestation (4WAI)

Chrysanthemum varieties assessed at 4 weeks after infestation (4 WAI), indicating that among all the evaluated varieties Bidhan Gol recorded the lowest nymphal population (1.76 and 2.04 nymphs per three leaves). This was followed by Bidhan Agnidev and Sunil, which registered 1.41 and 1.60 nymphs per three leaves, respectively, and were found to be statistically at par with each other. Denti White recorded a slightly higher nymphal population (2.48 nymphs per three leaves), although it also exhibited a comparatively lower level of infestation. In contrast, Ratlam Selection exhibited a moderate level of infestation with 6.12 nymphs per three leaves, whereas the highest nymphal population was recorded in Ajina Purple (8.24 nymphs per three leaves).

Response of chrysanthemum varieties against whitefly adult (*B. tabaci*)

One week After whitefly infestation (1 WAI)

Among the evaluated chrysanthemum varieties, Bidhan Gol recorded (0.2 adults per three leaves) the lowest adult whitefly population and followed by Denti White (0.52 adults per three leaves), while Bidhan Agnidev and Sunil exhibited comparatively lower adult populations (1.28 and 1.12 adults per three leaves) whereas, the highest adult whitefly population was observed in Ajina Purple (3.60 adults per three leaves).

Two weeks After infestation (2 WAI)

Results on two weeks after infestation (2 WAI), indicating that Bidhan Gol registered the lowest adult whitefly population (0.76 adults per three leaves), followed by Bidhan Agnidev, Denti White, and Sunil, which recorded relatively lower adult populations (1.62, 1.42 and 1.54 adults per three leaves) whereas the maximum adult population was observed in Ajina Purple (7.28 adults per three leaves).

Three weeks After infestation (3 WAI)

At three weeks after infestation (3 WAI), chrysanthemum varieties evaluated, Bidhan Gol, Bidhan Agnidev, Denti White, and Sunil recorded comparatively lower adult whitefly populations. In contrast, Ratlam Selection exhibited a moderate adult population, whereas the highest adult whitefly population was observed in Ajina Purple.

Four weeks after infestation (4 WAI)

Observation three weeks after infestation (4 WAI) showed the lowest adult whitefly population was recorded in Bidhan Gol, followed by Bidhan Agnidev, Sunil, and Denti White, all of which exhibited comparatively lower levels of infestation. Ratlam Selection showed a moderate adult population, whereas the highest whitefly population was observed in Ajina Purple.

Table 2: Performance of chrysanthemum variety against adult whitefly (*Bemisia tabaci*)

TTr. No.	Variety	Mean number of whitefly nymph per three leaves				Pooled over mean
		1 WAI	2WAI	3WAI	4WAI	
T1	Ajina Purple	2.02^{e} (3.60)	2.78^{d} (7.28)	2.74^{d} (7.04)	2.68^{d} (6.72)	2.56 (6.16)
T2	Bidhan Gol	0.82^{a} (0.20)	1.11^{a} (0.76)	1.46^{a} (1.64)	1.55^{a} (1.92)	1.25 (1.18)
T3	Ratlam Selection	1.46^{d} (1.66)	2.05^{c} (3.74)	2.24^{c} (4.52)	2.35^{c} (5.06)	2.02 (3.71)
T4	Bidhan Agnidev	1.33^{c} (1.28)	1.45^{b} (1.62)	1.69^{b} (2.38)	1.93^{b} (3.24)	1.60 (2.13)
T5	Denti White	1.00^{b} (0.52)	1.38^{b} (1.42)	1.57^{ba} (1.98)	1.78^{b} (2.68)	1.43 (1.65)
T6	Sunil	1.27^{c} (1.12)	1.42^{b} (1.54)	1.63^{b} (2.16)	1.79^{b} (2.72)	1.51 (1.82)
	Sem (±)	0.03	0.04	0.05	0.06	
	C. D. at5%	0.09	0.12	0.14	0.17	
	CV	5.35	5.51	5.64	6.32	

*Figures in parentheses are original values and those outside are square root transformed values In each column means followed by the same alphabet are statistically at par with each other WAI: Week After Infestation

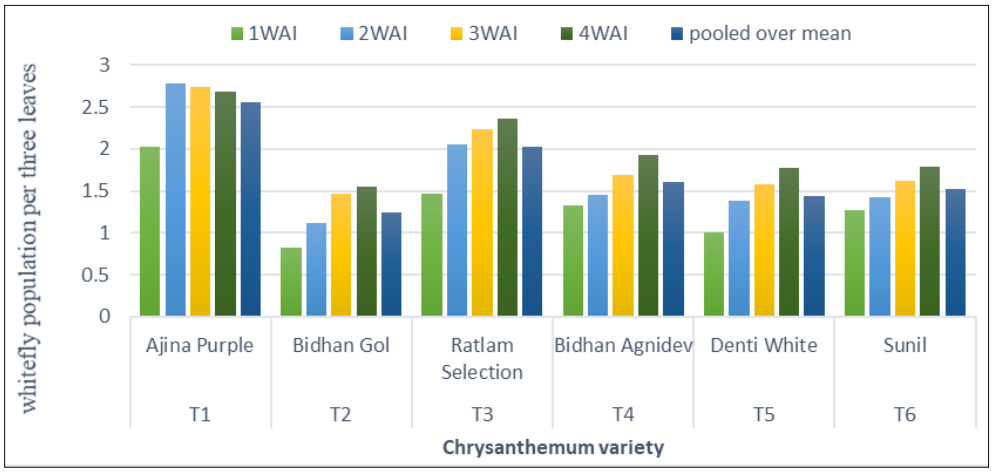

Fig 2: Performance of chrysanthemum variety against whiteflynymph

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