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Field evaluation of elite chickpea (*Cicer arietinum* L.) genotypes for resistance to Botrytis Grey Mold (BGM) and yield performance in Sarlahi, Nepal

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ABSTRACT

Botrytis grey mold (BGM), caused by *Botrytis cinerea*, is an important constraint to chickpea production in humid environments of Nepal. Field experiments were conducted at the Oilseed Research Program, Nawalpur, Sarlahi, Nepal, during the winter seasons of 2079/80 and 2080/81 to evaluate 12 elite chickpea genotypes, including released variety Tara as a standard check, received from Grain Legumes Research Program, Khajura, Banke for BGM response and yield performance. The experiment was conducted in a randomized complete block design with three replications. Data were recorded for phenological, agronomic and yield traits, along with BGM severity. Significant genotypic variation ($P<0.05$) was observed for BGM severity, flowering and maturity days, plant height, pods/plant and grain yield. Mean BGM severity decreased from 59.0% in the first year to 45.8% in the second year, while mean grain yield increased from 1017.7 to 1275.4 kg /ha. ICCV 87312 showed the lowest BGM severity in both years (44.4 and 31.5%) and recorded the highest grain yield in the second year (1773.7 kg/ha). KWR 108 also showed comparatively low and consistent BGM severity (44.4 and 38.9%) with good yield performance. The genotype × year interaction for BGM severity was non-significant indicating relatively consistent genotype responses across seasons. ICCV 87312 and KWR 108 are promising genotypes for further multi-location evaluation and breeding for moderate BGM resistance combined with high yield in Nepal.

Keywords: *Botrytis cinerea*, chickpea, disease severity, genotype, grain yield, host resistance, Nepal.

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INTRODUCTION

Chickpea (*Cicer arietinum* L.) is an important food legume of South Asia and contributes to dietary protein, soil fertility improvement through biological nitrogen fixation, and diversification of cereal based production systems. In Nepal, chickpea is mainly grown during the winter season in the Terai and inner-Terai regions, where its production is constrained by several biotic and abiotic stresses. The area, production and productivity of chickpea was 8,668 ha, 9,836 mt and 1.13 mt/ha respectively (MoAFE 2026). Among the diseases, Botrytis grey mold (BGM), caused by *Botrytis cinerea* Pers. ex Fr., is particularly important in the humid chickpea-growing environments of Nepal (Pande et al 1998). BGM has historically been particularly important in the eastern Terai, where yield losses of approximately 15% in farmers' fields have been reported, while much greater losses up to 65-95% may occur under highly favorable epidemic conditions (Joshi 1992, Pande and Rao 2000).

BGM is favored by high relative humidity, prolonged leaf wetness, cloudy weather and dense crop canopies, and generally becomes prominent around flowering and pod formation stage. Symptoms occur on leaves, stems, flowers and pods, and severe infection can result in extensive blighting, flower loss and poor pod development (Pande et al 2006). Past research demonstrated that the disease was widespread in chickpea growing areas of Nepal, with greater incidence and severity in the eastern than western Terai (Chaurasia and Joshi 2000) and showed considerable variation among chickpea materials in their response to the disease.

The management of BGM through host resistance is challenging because strong and stable resistance is relatively uncommon in cultivated chickpea (Pande et al 2006). However, moderate resistance can provide an important component of integrated disease management. The combined use of moderately resistant cultivars, appropriate crop spacing and judicious fungicide use for managing BGM in disease prone environments (GLRP 2020). The location-specific evaluation of elite chickpea materials against BGM under the agro-ecological conditions of Terai region remains important as BGM hot spot. Differences in temperature, relative humidity, rainfall, crop canopy development and disease favorable periods can influence BGM development and genotype performance (Sharma et al 2013). The multi-year evaluation is essential because disease pressure may vary considerably between seasons. Therefore, the present study was undertaken to evaluate elite chickpea genotypes under field conditions at Nawalpur, Sarlahi, identify genotypes with lower BGM severity, assess their yield potential across two growing seasons.

MATERIALS AND METHODS

A total of 12 elite chickpea genotypes, including Tara as the standard check, received from the Grain Legumes Research Program (GLRP), Khajura, Banke, were evaluated in a randomized complete block design (RCBD) with three replications at Oilseed Research Program (ORP), Nawalpur, Sarlahi, Nepal, during the winter seasons of 2079/80 and 2080/81. The trials were sown in the third week of November in both years. Each plot measured 9.6 m^2, with 40 cm row to row and 10 cm plant to plant spacing. Fertilizer was applied at 20:40:20 kg $N:P_2O_5:K_2O$ /ha, and other recommended agronomic practices were followed according to the GLRP protocol (GLRP 2020).

Data were recorded for days to flowering, days to maturity, plant height, pods/plant, seeds/pod, grain yield (kg/ha), thousand seed weight (g), and Botrytis grey mold (BGM) severity. BGM severity was assessed at the disease peak development stage using the 1-9 visual disease severity scale (Table 1), where 1 = no visible symptoms and 9 = severe infection with extensive plant damage (>75% leaves necrotic) (Pande and Rao 2000).

Table 1. Disease severity scale (1–9) used for assessment of Botrytis grey mold in chickpea

Score	Symptom description / Disease severity (%)	Interpretation
1	No visible BGM symptoms (0%)	Highly resistant
2	Very few small lesions on lower leaves/stems (1-10%)	Resistant
3	Few lesions, limited infection; no appreciable plant damage (11-20%)	Resistant
4	Moderate lesions on leaves and stems; slight plant damage (21-30%)	Moderately resistant
5	Noticeable infection with several lesions and partial blighting (31-40%)	Moderately susceptible
6	Extensive lesions and considerable blighting of foliage/branches (41-50%)	Moderately susceptible
7	Severe infection with extensive blighting and reduced plant vigor (51-60%)	Susceptible
8	Very severe infection; most foliage/branches affected and damage (61-70%)	Highly susceptible
9	Almost complete blighting/plant collapse or death (>71%)	Highly susceptible

and percent disease index (PDI) was calculated following Wheeler (1969) as:

$$\text{PDI (\%)} = \frac{\Sigma(n \times v)}{N \times V} \times 100 \text{ ....(Eq.1)}$$

where n = number of plants in each disease category, v = numerical grade, N = total plants assessed, and V = maximum disease grade. All data were analyzed using ANOVA in Genstat Discovery 18th edition, and treatment means were compared using LSD at 5% probability. Data from each year were analyzed separately to assess annual variation in disease severity and yield response.

These recorded data were analyzed using statistical software Genstat discovery 18th edition.

RESULTS

Statistically significant differences (P≤ 0.05) were observed among the chickpea genotypes for all measured traits. Days to flowering ranged from 110.0 to 114.0 days and days to maturity from 156.7 to 166 days, while plant height varied from 21.4 to 30.4 cm. Pod number per plant showed considerable variation (5.6-24.4), with ICCV 98933 recording the highest value. Grain yield ranged from 864.6 to 1247.6 kg/ha, with ICCX 840508-38 recording the highest yield (1247.6 kg/ha), followed by ICCV 98937 (1153.4 kg/ ha) and ICCV 98933 (1131 kg/ha). Thousand-seed weight ranged from 100 to 114.3 g. Botrytis grey mold (BGM) severity varied significantly from 44.4 to 72.2%; ICCV 87312 and KWR 108 exhibited the lowest severity (44.4%), whereas Tara (SC) showed the highest severity (72.2%). The overall mean BGM severity and grain yield were 59.0% and 1017.7 kg/ha, respectively (Table 2).

Table 2. Botrytis grey mold severity, yield and ancillary traits of elite chickpea genotypes at Nawalpur, Sarlahi, Nepal, during 2079/80

Genotypes	FL_D	Mat _D	PHT (cm)	Pod /PL	SD /Pod	GY (kg/ha)	TSW (g)	BGM PDI %
ICCV 87312	110.0	157.7	21.4	16.7	1.7	981.5	109.7	44.4
ICCV 98937	112.0	157.3	27.6	15.2	1.0	1153.4	103.0	55.6
ICCV 97207	112.0	156.7	26.3	5.6	1.0	964.7	113.0	66.7
ICCX 840508-38	111.0	157.7	25.5	16.3	1.3	1247.6	102.7	55.6
ICCX 840508-40	111.0	166.0	24.4	9.9	1.0	1038.9	104.7	61.1
ICCV 840508-41	114.0	166.0	27.5	11.4	1.0	864.6	100.0	66.7
KWR 108	112.0	158.3	21.4	14.5	1.7	1062.4	102.3	44.4
ICCV 98933	114.0	164.7	30.4	24.4	1.0	1131.0	106.0	61.1

Genotypes	FL_D	Mat _D	PHT (cm)	Pod /PL	SD /Pod	GY (kg/ha)	TSW (g)	BGM PDI %
KPG 59	111.0	158.3	29.6	14.5	1.0	875.1	104.7	55.6
BG 372	111.7	158.7	27.1	14.4	1.0	969.9	104.0	66.7
ICCX 840508-31	112.0	160.3	24.4	12.3	1.0	997.6	114.3	57.4
Tara (SC)	114.0	157.3	24.3	10.6	1.7	925.6	106.0	72.2
Grand mean	112.1	159.9	25.8	13.8	1.2	1017.7	105.9	59.0
Min	110.0	156.7	21.4	5.6	1.0	864.6	100.0	44.4
Max	114.0	166.0	30.4	24.4	1.7	1247.6	114.3	72.2
P-value	<.001	<.001	<.001	<.001	0.05	<.001	0.03	<.001
LSD (0.05)	1.66	3.24	1.64	1.35	0.58	98.82	7.98	9.46
CV,%	0.9	1.2	3.7	5.8	28.8	5.7	4.5	9.5

FL_D - days to flowering, MAT_D – days to maturity, PHT- plant height, Pod/PL – pod per plant, SD/Pod: Seed per pod, GY-grain yield, TSW–thousand seed weight, BGM-botrytis grey mold, PDI-percent disease index, cm-centimeter, kg/ha- kilogram per hectare, g-gram, SC- standard check

During second year of experiment also, except seed per pod, significant differences ($P \leq 0.05$) were observed among chickpea genotypes for flowering and maturity days, plant height, pods per plant, grain yield, thousand seed weight, and Botrytis grey mold (BGM) severity. Days to flowering ranged from 95 to 102 days and days to maturity from 145 to 152 days (Table 3).

Table 3. Botrytis grey mold severity, yield and ancillary traits of elite chickpea genotypes at Nawalpur, Sarlahi, Nepal, during 2080/81

Genotypes	FL _D	Mat _D	Pht (cm)	Pod /plant	SD /Pod	GY (kg/ha)	TSW (g)	BGM PDI %
ICCV 87312	95.0	146.0	63.8	65.0	1.6	1773.7	193.3	31.5
ICCV 98937	97.0	151.0	43.7	61.3	1.6	1346.0	210.0	46.3
ICCV 97207	98.0	147.0	67.7	60.3	1.6	1195.7	192.0	38.9
ICCX 840508-38	98.0	148.0	63.3	56.7	1.6	1376.0	200.0	44.4
ICCX 840508-40	101.0	145.0	64.0	62.0	1.6	1156.9	203.3	42.6
ICCV 840508-41	96.0	146.0	64.0	58.0	1.7	1157.6	186.7	48.1
KWR 108	96.0	146.0	64.3	57.7	1.6	1371.0	200.0	38.9
ICCV 98933	99.0	151.0	62.0	61.7	1.7	1212.0	190.0	66.7
KPG 59	101.0	148.0	64.3	62.0	1.6	1360.8	190.0	46.3
BG 372	102.0	152.0	53.7	61.7	1.6	1193.2	190.0	53.7
ICCX 840508-31	101.0	146.0	64.7	64.3	1.5	1232.5	170.0	40.7
Tara (SC)	98.0	147.0	64.0	62.0	1.4	928.9	190.0	51.9
Grand mean	98.5	147.8	61.6	61.1	1.6	1275.4	192.9	45.8
Min	95.0	145.0	43.7	56.7	1.4	928.9	170.0	31.5
Max	102.0	152.0	67.7	65.0	1.7	1773.7	210.0	66.7
P-value	<.001	<.001	<.001	<.001	0.06	<.001	0.01	<.001
LSD (0.05)	1.33	1.96	2.8	2.81	0.16	36.01	16.49	8.56
CV,%	0.8	0.8	2.7	2.7	5.9	1.7	5.0	11.0

FL_D - days to flowering, MAT_D – days to maturity, PHT- plant height, Pod/PL – pod per plant, SD/Pod: Seed per pod, GY-grain yield, TSW–thousand seed weight, BGM-botrytis grey mold, PDI-percent disease index, cm-centimeter, kg/ha- kilogram per hectare, g-gram, SC- standard check

Plant height varied from 43.7 to 67.7 cm, while pods per plant ranged from 56.7 to 65.0. ICCV 87312 recorded the highest grain yield (1773.7 kg/ha), exceeding the grand mean of 1275.4 kg/ha, whereas Tara (Standard check variety) had the lowest yield (928.9 kg/ha).

Thousand-seed weight ranged from 170 to 210 g. BGM severity varied significantly from 31.5 to 66.7%**;** ICCV 87312 showed the lowest disease severity (31.5%), indicating resistance genotype, while ICCV 98933 exhibited the highest severity (66.7%). The overall mean BGM severity was 45.8% and grain yield 175.4 kg/ha (Table 3).

The combined analysis across two years revealed significant differences **(**P<0.05**)** among chickpea genotypes for flowering time, maturity, plant height, pods per plant and grain yield, while seed number per pod and thousand-seed weight were not significantly different among genotypes. Genotypes also differed significantly in BGM severity **(**P< 0.001**)**, which ranged from 38.0% in ICCV 87312 to 63.9% in ICCV 98933**.** ICCV 87312 showed the lowest disease severity and also produced the highest grain yield (1377.6 kg/ha) among genotypes in the combined genotype means (Table 4).

A marked year effect (P<0.001) was observed for all traits, including BGM severity. The second year (FY 2080/81) had earlier flowering (98.5 vs. 112.1 days), earlier maturity (147.8 vs. 159.9 days), greater plant height (61.6 vs. 25.8 cm), more pods per plant (61.1 vs. 13.8), higher grain yield (1275.4 vs. 1017.7 kg/ha), and greater thousand-seed weight (192.9 vs. 105.9 g) than the first year. Importantly, mean BGM severity was significantly lower in the second year (45.8%) than in the first year (59.0%)**,** indicating year-to-year variation in disease development (Table 4).

The genotype × year interaction was significant for most agronomic traits**,** including flowering, maturity, plant height, pods per plant, seed number per pod, grain yield and thousand-seed weight, indicating differential genotype performance across years. However, the genotype × year interaction for BGM severity was not significant (P=0.192)**.** This suggests that although disease severity varied between years, the response of genotypes to BGM remained consistent across environment. ICCV 87312 maintained relatively low BGM severity in both years (44.4% in FY 2079/80 and 31.5% in FY 2080/81) and showed higher grain yield, particularly in the second year (1773.7 kg/ha), increasing its potential as a promising genotype (Table 4) for further evaluation and BGM resistance breeding.The significant year effect but non-significant genotype × year interaction for BGM severity is an important result. It indicates that environmental conditions strongly influenced overall BGM pressure, whereas genotype ranking for disease response was relatively stable across the two years.

Table 4. Combined analysis of genotype, year and genotype × year effects on Botrytis grey mold severity, yield and ancillary traits of elite chickpea genotypes at Nawalpur, Sarlahi, Nepal

Genotypes	**FL _D**	**Mat _D**	**PHT (cm)**	**Pod /PL**	**SD /Pod**	**GY (kg/ha)**	**TSW (g)**	**BGM PDI %**
ICCV 87312	102.5	151.8	42.6	40.9	1.6	1377.6	151.5	38.0
ICCV 98937	104.5	154.2	35.6	38.3	1.3	1249.7	156.5	50.9
ICCV 97207	105.0	151.8	47.0	32.9	1.3	1080.2	152.5	52.8
ICCX 840508-38	104.5	152.8	44.4	36.5	1.5	1311.8	151.3	50.0
ICCX 840508-40	106.0	155.5	44.2	35.9	1.3	1097.9	154.0	51.9
ICCV 840508-41	105.0	156.0	45.8	34.7	1.4	1011.1	143.3	57.4
KWR 108	104.0	152.2	42.9	36.1	1.6	1216.7	151.2	41.7
ICCV 98933	106.5	157.8	46.2	43.0	1.4	1171.5	148.0	63.9
KPG 59	106.0	153.2	47.0	38.3	1.3	1117.9	147.3	50.9
BG 372	106.8	155.3	40.4	38.0	1.3	1081.5	147.0	60.2

Genotypes	FL _D	Mat _D	PHT (cm)	Pod /PL	SD /Pod	GY (kg/ha)	TSW (g)	BGM PDI %
ICCX 840508-31	106.5	153.2	44.5	38.3	1.3	1115.0	142.2	49.1
Tara (SC)	106.0	152.2	44.2	36.3	1.5	927.2	148.0	62.0
P-value	<.001	<.001	<.001	<.001	0.09	<.001	0.08	<.001
LSD (0.05)	1.09	1.85	1.63	1.51	0.29	51.01	8.85	10.01
Year								
FY 2079/80 (Y1)	112.1	159.9	25.8	13.8	1.2	1017.7	105.9	59.0
FY 2080/81 (Y2)	98.5	147.8	61.6	61.1	1.6	1275.4	192.9	45.8
P-value	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
LSD (0.05)	0.45	0.75	0.67	0.61	0.11	20.82	3.61	4.09
Genotype × Year								
ICCV 87312 × Y1	110.0	157.7	21.4	16.7	1.7	981.5	109.7	44.4
ICCV 98937 × Y1	112.0	157.3	27.6	15.2	1.0	1153.4	103.0	55.6
ICCV 97207 × Y1	112.0	156.7	26.3	5.6	1.0	964.7	113.0	66.7
ICCX 840508-38 × Y1	111.0	157.7	25.5	16.3	1.3	1247.6	102.7	55.6
ICCX 840508-40 × Y1	111.0	166.0	24.4	9.9	1.0	1038.9	104.7	61.1
ICCV 840508-41× Y1	114.0	166.0	27.5	11.4	1.0	864.6	100.0	66.7
KWR 108× Y1	112.0	158.3	21.4	14.5	1.7	1062.4	102.3	44.4
ICCV 98933× Y1	114.0	164.7	30.4	24.4	1.0	1131.0	106.0	61.1
KPG 59× Y1	111.0	158.3	29.6	14.5	1.0	875.1	104.7	55.6
BG 372× Y1	111.7	158.7	27.1	14.4	1.0	969.9	104.0	66.7
ICCX 840508-31× Y1	112.0	160.3	24.4	12.3	1.0	997.6	114.3	57.4
Tara (SC)× Y1	114.0	157.3	24.3	10.6	1.7	925.6	106.0	72.2
ICCV 87312 × Y2	95.0	146.0	63.8	65.0	1.6	1773.7	193.3	31.5
ICCV 98937 × Y2	97.0	151.0	43.7	61.3	1.6	1346.0	210.0	46.3
ICCV 97207 × Y2	98.0	147.0	67.7	60.3	1.6	1195.7	192.0	38.9
ICCX 840508-38 × Y2	98.0	148.0	63.3	56.7	1.6	1376.0	200.0	44.4
ICCX 840508-40 × Y2	101.0	145.0	64.0	62.0	1.6	1156.9	203.3	42.6
ICCV 840508-41× Y2	96.0	146.0	64.0	58.0	1.7	1157.6	186.7	48.1
KWR 108× Y2	96.0	146.0	64.3	57.7	1.6	1371.0	200.0	38.9
ICCV 98933× Y2	99.0	151.0	62.0	61.7	1.7	1212.0	190.0	66.7
KPG 59× Y2	101.0	148.0	64.3	62.0	1.6	1360.8	190.0	46.3
BG 372× Y2	102.0	152.0	53.7	61.7	1.6	1193.2	190.0	53.7
ICCX 840508-31× Y2	101.0	146.0	64.7	64.3	1.5	1232.5	170.0	40.7
Tara (SC)× Y2	98.0	147.0	64.0	62.0	1.4	928.9	190.0	51.9
Grand mean	105.3	153.8	43.7	37.4	1.4	1146.5	149.4	52.4
Min	95.0	145.0	21.4	5.6	1.0	864.6	100.0	31.5
Max	114.0	166.0	67.7	65.0	1.7	1773.7	210.0	72.2
P-value	<.001	<.001	<.001	<.001	0.007	<.001	<.001	0.192
LSD (0.05)	1.55	2.61	2.31	2.14	0.42	72.14	12.59	14.16
CV,%	**0.9**	**1.03**	**3.2**	**3.48**	**18.12**	**3.83**	**5.12**	**16.4**

FL_D - days to flowering, MAT_D – days to maturity, PHT- plant height, Pod/PL – pod per plant, SD/Pod: Seed per pod, GY-grain yield, TSW–thousand seed weight, BGM-botrytis grey mold, PDI-percent disease index, cm-centimeter, kg/ha- kilogram per hectare, g-gram, SC- standard check, Y1-FY 2079/80, Y2- FY 2080/81

Seasonal Weather Variation and Its association with crop performance and BGM severity

The weather conditions during the two chickpea growing seasons in Nawalpur, Sarlahi region showed distinct temperature and moisture patterns that were closely associated with crop development and Botrytis grey mold severity. During the first year (November 2022-May 2023), temperatures declined from approximately 30°C in November to cooler conditions during January–February, followed by a progressive increase to >35-40°C during April–May; relative humidity remained comparatively high during winter (generally 80-95%) before declining during the warmer spring period, with intermittent rainfall events. These cool and humid conditions during the vegetative and reproductive stages were conducive to BGM development, resulting in a relatively high mean BGM severity (59.0% PDI), while the crop showed delay flowering (112.1 days), delay maturity (159.9 days), shorter plants (25.8 cm), fewer pods/plant (13.8), lower grain yield (1017.7 kg/ha), and lower 1000-seed weight (105.9 g). In the second year (November 2023-May 2024), the crop experienced a similar seasonal transition but generally developed more rapidly, with flowering and maturity occurring earlier (98.5 and 147.8 days, respectively), and higher plant height (61.6 cm), pods/plant (61.1), seeds/pod (1.6), grain yield (1275.4 kg/ha), and 1000-seed weight (192.9 g). The BGM severity was lower (45.8% PDI), suggesting that the shorter crop duration and improved crop growth and yield formation in second year may have reduced exposure to prolonged disease-favorable conditions. The results indicate that cool, humid conditions during critical crop growth stages were associated with greater BGM severity in first year of experiment, whereas earlier crop development and reduced disease pressure in second year coincided with improved yield and yield components**.** The June-October 2023 period was the non-observation period represented with the continuous parallel line in the graph (Figure 1)

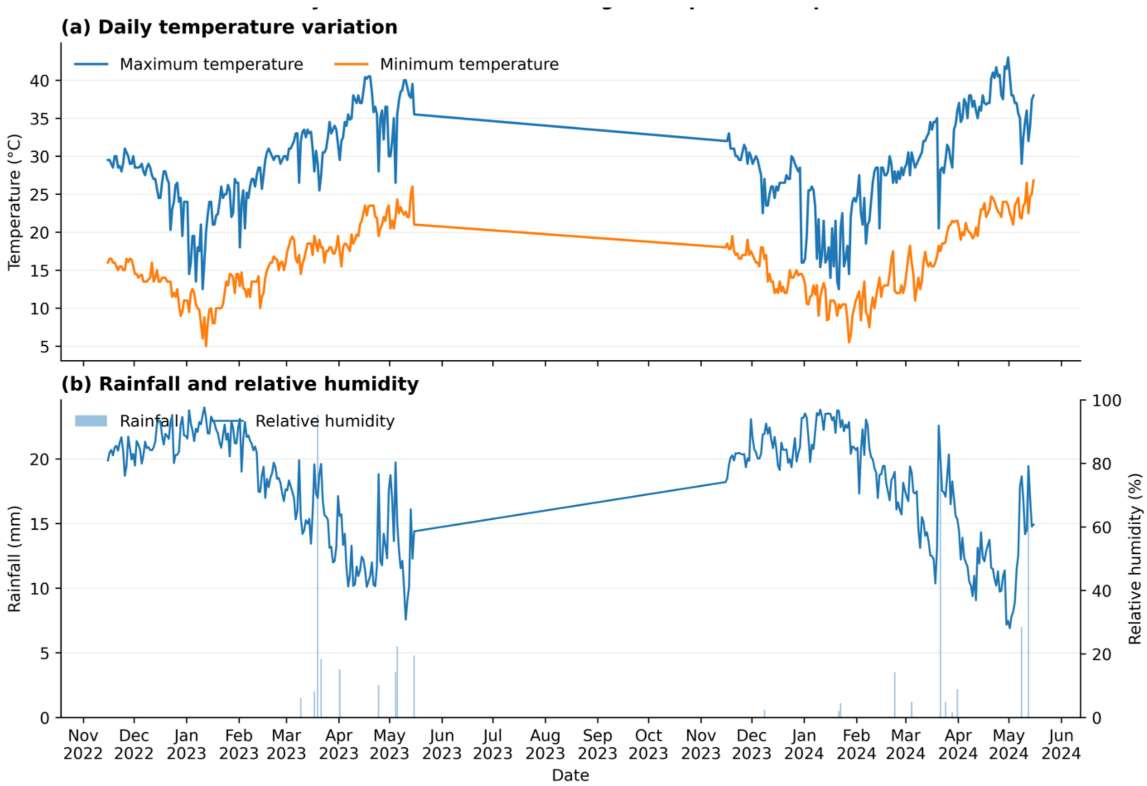

Figure 1. Daily average temperature (°C) variation, total rainfall (mm) and average relative humidity (%) in Nawalpur Sarlahi conditions during 2022-2024 (two season experiments)

DISCUSSION

The multi-year evaluation demonstrated significant variation among the 12 elite chickpea genotypes for BGM severity, phenology and yield-related traits, indicating useful genetic variability for selection. Mean BGM severity decreased from 59.0% in 2079/80 to 45.8% in 2080/81, while grain yield increased from 1017.7 to 1275.4 kg/ha**,** indicating a strong seasonal influence on disease development and crop productivity. Such environmental influence is consistent with earlier studies showing that BGM epidemics are strongly affected by prevailing environmental conditions and that environment can contribute to variation in disease response (Sharma and Sharma 2023). In Nepal, BGM has long been recognized as a major constraint to chickpea production, particularly in the Terai, with higher disease pressure under favorable conditions (Joshi 1992, GLRP 2020). Among the tested genotypes, ICCV 87312 was particularly promising, recording the lowest BGM severity in both years (44.4 and 31.5%) and the highest grain yield in the second year (1773.7 kg/ha). KWR 108 also showed comparatively low and consistent BGM severity (44.4 and 38.9%) with good yield performance. These responses are consistent with previous research demonstrating genotypic variation for BGM resistance. Earlier report reported that lower BGM severity in ICCV 97207 than in Abarodhi and KPG 59 under western Terai conditions (GLRP 2020). Similarly, multi-environment testing at different NARC stations of Nepal identified several chickpea genotypes with moderate BGM resistance and reasonable stability, although genotype × environment interaction was significant in the broader multi-location study (GLRP 2020, Sharma et al 2013). In the present study, genotype × year interaction for BGM severity was non-significant, despite significant year effects, suggesting relatively consistent ranking of genotypes for disease response across the two seasons at Sarlahi. This is particularly encouraging for ICCV 87312**,** which combined comparatively lower BGM severity with higher yield. However, none of the tested genotypes considered highly resistant solely on the basis of this two year, single location evaluation, as previous Nepalese studies have similarly reported difficulty in identifying complete resistance to BGM (Sharma et al 2013). Therefore, ICCV 87312 and KWR 108 should be further validated across multiple BGM-prone locations and seasons as potential sources of moderate resistance and high yield.

CONCLUSION

Field evaluation of 12 elite chickpea genotypes during two consecutive years at Nawalpur, Sarlahi demonstrated genotypic variation for Botrytis grey mold severity, phenology and yield-related traits among the tested genotypes. ICCV 87312 emerged as the most promising genotype, combining comparatively low and consistent BGM severity (44.4% and 31.5% in the two years) with higher grain yield (1773.7 kg/ha), while KWR 108 also showed relatively low disease severity and good yield performance. The non-significant genotype × year interaction for BGM severity indicated relatively consistent disease response across seasons at Sarlahi. Therefore, ICCV 87312 and KWR 108 are recommended for further multi-location and multi-year evaluation as potential sources of moderate BGM resistance and high yield**.**

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Authors' contributions

S Subedi was directly involved in the research design, analysis of data and draft preparation of manuscript. SK Sah involved in the conduction of field experiment and data recording while A Pokhrel, P Paudel and S Neupane were involved as helping hands for research concept, design and field experiment as well as data recording and analysis. J Shrestha had contribution on guideline for research methodology and manuscript editing.

Conflicts of interest

The authors have no relevant financial or non-financial interests to disclose.

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