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Research Paper

Relationship between weather factors and planting dates with references to growth and yield of potato (*Solanum tuberosum*) varieties

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ABSTRACT

A field experiment was conducted during the winter season of 2016–17 and 2017–18 at the research farm of the Department of Agricultural Meteorology, College of Agriculture, Chaudhary Charan Singh Haryana Agricultural University, Hisar, Haryana to quantify the effect of different planting dates on the growth and yield of potato (*Solanum tuberosum* L.) cultivars. The experiment comprised 12 treatment combinations involving 4 date of sowing, viz. D_1, 8 October; D_2, 22 October; D_3, 5 November and D_4, 15 November as main plot treatment and viz. 3 varieties V_1, 'Kufri Bahar', V_2, 'Kufri Pushkar' and V_3, 'Kufri Surya', as sub-plot treatment in a split-plot design, replicated 4 times. The maximum tuber yield was recorded in D_2 (21.9 tonnes/ha) as compared to the other sowing dates and the lowest in D_4 (16.5 tonnes/ha). Among the varieties, 'Kufri Pushkar' had a significantly higher tuber yield (23.2 tonnes/ha) than 'Kufri Bahar' (18.0 tonnes/ha) and 'Kufri Surya' (16.6 tonnes/ha) during the crop season. Plant height, dry matter accumulation and biological yield were positively correlated with wind speed, rainfall and rainy days. The number of leaves/plant and leaf-area index (LAI) was significantly, negatively correlated with maximum and minimum temperatures, whereas it showed significant positive correlations with wind speed. Evening relative humidity was also positively correlated with LAI and tuber yield of potatoes. However, improved cultivars along with ideal planting windows at micro-level identification were the best way to mitigate the challenges posed by the climate in potatoes in near future.

Key words: Crop-weather relationship, Growth parameters, LAI, Planting dates, Potato, Yield attributes

The potato (*Solanum tuberosum* L.) is the 3rd most important food crop in the world after rice (*Oryza sativa* L.) and wheat (*Triticum aestivum* L.) and is consumed by more than a billion people worldwide (Jansky *et al*., 2019). India is presently ranked second in global potato production. It is cultivated over an area of approximately 2.25 million ha, with a production of 54.23 million ton and productivity of 26.60 t/ha (DES, 2021). In Haryana, potato is cultivated over an area of approximately 31000 ha with a production of 0.80 million tonnes and productivity of 26.25 tonnes/ha (DES, 2021). India faces a tremendous challenge to increase the productions of all food crops, including potatoes to meet future needs.

Potato is regarded as a high-potential food-security crop because of its ability to provide a potential yield of high-quality product per unit input with a shorter life-cycle of crops (mostly <120 days) than major cereal crops like maize (*Zea mays* L.). The potato provides nutritious food in a diversity of environments. Meteorological elements governing the growth, development, production and quality of potato tubers at a given site are air and soil temperatures, solar radiation, photoperiod, soil moisture and evapotranspiration. Potato is best adapted to cool climates such as tropical highlands with mean daily temperatures between 15ºC and 18ºC. Higher temperatures favour foliar development and retard tuberization. In addition, heat stress leads to a higher number of smaller tubers/plant; lower tuber specific gravity with reduced dry-matter content, and usually to paler skin color of the tubers (Adane *et al*., 2010).

Vegetables production is considered to be particularly important in satisfying world food demand. Specific research therefore, is needed to evaluate the effects of environmental factors that crop encounters during their growth on production. Very early planting may expose the crop to higher temperature at the reproductive stage while late planting may result in low biomass production and affect tuber development due to higher temperature conditions at

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maturity of winter (*rabi*) crops including potatoes. The crop management practices, such as changing planting date or selection of varieties modifying plant duration will affect potential yield. Potato varieties have divergence for morphological, physiological and yield potential that allow them to respond differently to planting environment is another factor that may affect the growth and yield of potatoes. The objectives of the paper are to understand the extent that the optimum planting window along with improved varieties in the Subtropical region has adapted to changing climatic conditions. Therefore, this study was planned to investigate the effect of planting dates and varieties interaction on growth and yield of potato under different planting dates, and effects on crop weather relationships in sub-tropical environment.

MATERIALS AND METHODS

An experiment was conducted in the winter (*rabi*) season of 2016–17 and 2017–18 at the research farm (29° 10' N, 75° 46' E, 215.2 m above mean sea level) of the Department of Agricultural Meteorology, Chaudhary Charan Singh Haryana Agricultural University, Hisar. The climate of Hisar is mainly characterized by its continental location on the outer margins of the monsoon region. It is situated in the tract of semi-arid and subtropical monsoonal climate. In winter only 2–3 rainy showers are received due to western disturbances followed by low temperature. The occurrence of frost on certain days is also not an unusual feature for the place. The coefficient of variation for annual rainfall ranges between 45% and 50%, whereas the seasonal variation during monsoon season can go up to 80% and during the winter season around 65%. The average annual rainfall in the tract is around 450 mm, most of which is received during south–west monsoon season.

The weekly values of weather parameters prevailed during the *rabi* (2016–17 and 2017–18) were worked out based on daily data recorded at Agromet Observatory, CCS HAU, Hisar situated just beside the experimental site along with normal values for various weather parameters. Weekly mean maximum and minimum temperature values (Tmax and Tmin) during both crop season were deviated from normal in the entire crop season. A comparison between 2 seasons showed that, mean maximum and minimum temperature prevailed from emergence to physiological maturity was higher during 2016–17 than subsequent crop season. The fluctuations of mean weekly morning and evening relative humidity (RHm and RHe) were higher throughout the crop season 2016–17 as compared to 2017–18 except the span of vegetative stage where these were lower than the normal. It varied much uneven and abruptly oscillating in reproductive stage during 2016–17 from normal.

The amount of rainfall (RF) and its distribution were uneven and erratic rainfall during the crop growing season in 2016–17 and it was uniform in 2017–18. The *rabi* season of 2016–17 received a total of 53.2 mm rainfall with 3 rainy days out of which vegetative phase had received no rainfall but at reproductive stage, it received much higher rainfall. Only 2 rainy days were recorded during whole crop season 2017–18 and received a total of 14.7 mm. During 2016–17, crop seasons received above normal rainfall (53.2 mm, whereas normal rainfall is 36.4 mm) and in 2017–18, crop season recorded below normal (14.7 mm). The weekly mean sunshine hour values (BSS) were fluctuated much throughout the crop season as compared to normal during both season, during 2017–18 was characterized by lower sunshine duration. The mean weekly wind speed values (WS) during both crop seasons were abnormally fluctuated from normal. They are in the range of 1.1 to 5.0 km/h and 0.7 to 5.1 km/h during 2016–17 and 2017–18. The seasonal mean weekly cumulative pan evaporation value (PE) was 38.7 mm in 2016–17 and 41.8 mm during 2017-18 as against the normal of 36.4 mm and thus leading to non-stress conditions for most of the growing season and more-moist conditions were available in 2017–18.

The soil was low in organic carbon and nitrogen, medium in phosphorus and rich in potassium and slightly alkaline in reaction. The physico-chemical properties of the experimental soil were analysed through various methods of estimation and found that the percentage of sand (56.7 and 55.2), silt (25.8 and 26.6) and clay (17.8 and 18.4) during 2016–17 and 2017–18. The textural class of soil was sandy loam and the chemical composition of the soil was estimated through various standard methods of estimation like soil *p*H (1:2 soil water suspensions) with the use of glass electrode *p*H meter was 8.1 and 8.0 during 2016–17 and 2017–18.

The electrical conductivity (dS/m at 25 ºC) was estimated by conductivity bridge method was 0.68 and 0.71 and organic carbon (%) by Walkley and Blacks wet oxidation method was 0.43 and 0.49 during 2016–17 and 2017–18. The available N (kg/ha by alkaline permanganate method was 162, available P_2O_5 (kg/ha) by Olsen's method was 25 and 26 and available K_2O (Kg/ha) by flame photometer method was 321 and 320 during 2016–17 and 2017–18, respectively.

The main plot of 16 treatment combinations of 4 planting dates, viz. D_1, 8 October; D_2, 22 October; D_3, 5 November and D_4, 15 November on 3 varieties (V_1, 'Kufri Bahar', V_2, 'Kufri Pushkar' and V_3, 'Kufri Surya', as a subplots treatment, were arranged in a split plot design with 4 replications. Each plot was 5.0 m wide and 3.6 m long. Presprouted potato was sown manually from seed potatoes–small tubers at 60 cm × 20 cm apart at a depth of 5 cm to 10 cm. The recommended dose of nitrogen (150 kg N/

ha), phosphorus (50 kg P_2O_5/ha) and potassium (100 kg/ha) were applied. The full dose of diammonium phosphate, muriate of potash and half dose of nitrogen were applied before sowing and the remaining N was top dressed after 25–30 days after sowing at earthing up. For growth and yield attribute 5 plants in each plot were tagged randomly in the field. Plant height was measured from the base of the plant to the tip of the main stem. The green leaf-area (cm^2) was recorded using leaf-area meter. The sampled plants were separated into roots, stems, leaves and reproductive parts (stolon and tuber) and sun-dried. Further, the samples were oven-dried at 65ºC to 70ºC to a constant weight. The biomass/dry-matter accumulation in different plant parts was converted to gram per plant.

Yield parameters, viz. tubers/plant and tuber weight/plant, were recorded at the time of digging. The tuber yield was recorded from net plot. The growth and yield parameters, viz. numbers of tubers/plant, tuber weight (g/tuber), tuber yield/plant (g), tuber yield (tonnes/ha), biological yield (tonnes/ha) and harvest index (%) were subjected to statistical analysis using OPSTAT software available at www.hau.ernet.in. The recorded data were averaged and statistically analysed as per Sheoran *et al*. (1998) using the statistical programme OPSTAT.

RESULTS AND DISCUSSION

Growth parameters

All the growth parameters increased with the advancement of crop stages from emergence to physiological maturity. Among the planting dates, the maximum plant height was recorded in D_2 followed by D_1, D_3 and the minimum in D_4 during both the crop seasons. The plant height was recorded higher in D_2 (15.5 cm) and lower in D_4 (9.33 cm) at emergence, respectively. At physiological maturity, D_2 attained the maximum height, i.e. 44.8 cm and 36.4 cm respectively. However, height of crop plant was more in reproductive phases during 2017–18 as compared to 2016–17. Among varieties, the 'Kufri Pushkar' recorded maximum plant height (13.2 cm to 43.9 cm) followed by 'Kufri Bahar' (11.7 cm to 39.3 cm), 'Kufri Surya' (10.3 cm to 38.8 cm) from emergence to physiological maturity in the pooled year, respectively. Modisane (2007) also concluded that, plant height was higher in October sown potato crop than the late sown one. Thongam *et al*. (2017) also reported that number of leaves/plant were more in 10 October sown crop as compared to other dates in potato for assessing growth and development of potato, supports the our results of these findings.

The leaves/plant were significantly more in D_2 (176) than in D_4 (134) at tuber bulking stages during crop season, stage after this it started declining up to physiological maturity (Table 1). Among the varieties, 'Kufri Pushkar'

Table 1. Effect of planting dates on plant height (cm) and number of leaves/plant of potato varieties at various phenophases (pooled data of 2 years)

Treatment	Plant height (cm)					Number of leaves/plant				
	Emergence	Stolonization	Tuber initiation	Tuber bulking	Physiological maturity	Emergence	Stolonization	Tuber initiation	Tuber bulking	Physiological maturity
Date of planting										
D_1, 8 October	11.4	20.5	31.7	36.1	42.3	15.4	50.9	111	162	129
D_2, 22 October	15.5	22.1	37.6	41.3	44.8	17.9	60.3	125	176	136
D_3, 4 November	10.5	17.8	30.1	35.5	39.1	12.8	40.2	106	154	123
D_4, 15 November	9.3	15.3	24.4	33.5	36.4	10.1	34.5	99.5	134	113
SEm±	0.31	0.72	0.80	1.08	0.57	0.36	1.46	2.12	8.17	3.20
CD (P=0.05)	1.00	2.35	2.58	3.51	1.88	1.17	4.74	6.86	NS	10.1
Varieties										
V_1, 'Kufri Bahar'	11.6	21.2	31.1	37.5	39.3	14.2	47.8	118.7	146	131
V_2, 'Kufri Pushkar'	13.2	20.2	34.9	42.3	43.9	17.9	55.9	118.9	169	136
V_3, 'Kufri Surya'	10.3	15.3	28.4	30.7	38.8	9.98	35.6	94.1	128	108
SEm±	0.26	0.65	0.46	0.75	1.01	0.39	1.56	1.45	6.62	3.88
CD (P=0.05)	0.76	1.91	1.34	2.20	NS	1.15	4.58	4.27	19.4	11.4

*NS, Treatment difference not significant

produced maximum number of leaves/plant (18 to 135) followed by 'Kufri Bahar' (14.2 to 130) and 'Kufri Surya' (9.98 to 108.2) from emergence to physiological maturity. The maximum numbers of stems/hill were recorded in D_2 (16.1) followed by D_1 (13.6), D_3 (12.4) and the minimum in D_4 (10.8) at physiological maturity. Among the varieties, 'Kufri Pushkar' recorded maximum number of stem/hills (1.94 to14.9) followed by 'Kufri Bahar' (1.46 to 13.4) and 'Kufri Surya' (1.13 to 11.4) from emergence to physiological maturity during the seasons. Thongam *et al.* (2017) also reported that number of stem/hill were more in 10 October sown crop as compared to other dates in potato for assessing growth and development of potato.

Leaf-area index (LAI) of potato crop increased with the advancement of crop stage from emergence to tuber bulking stage and decreased thereafter at physiological maturity and it followed similar pattern of number of leaves/plant (Table 2). Among the planting dates, LAI was significantly highest in D_2 followed by D_1, D_3 and the lowest in D_4 from emergence to physiological maturity. The D_2 gained the highest LAI, i.e. 4.32, at tuber bulking stage. However, LAI was more in all the phenophases during 2017–18 as compared to 2016–17. 'Kufri Pushkar' accumulated more LAI followed by 'Kufri Bahar' and 'Kufri Surya' in both the crop seasons. 'Kufri Pushkar' accumulated maximum LAI, i.e. 4.24, at tuber bulking stage; this might be owing to more photosynthetically active radiation absorption and elongated vegetative phase was recorded by 'Kufri Pushkar' than other varieties and lower in 'Kufri Bahar'.

Dry-matter accumulation (ultimate production capability of the crop) was more in D_2 followed by D_1, D_3 and D_4 planting. All planting dates differed significantly in producing dry- matter at all the important phenophases. Dry matter accumulation increased linearly from the emergence to physiological maturity because dry matter accumulation depends on the amount of solar radiation intercepted by the crop (Haverkort *et al*., 2004). Thongam *et al*. (2017) also reported that dry matter was more in October 10 sown crop followed by other dates and it was the least in December in Maharashtra region. However, late sown crop suffered from lower bright sunshine hours, and consumed lower growing degree-days and photothermal units at physiological maturity also. Our findings supporting the results of Haverkort *et al*. (2004).

Yield and its attributes A significant effect of treatment was noted on the tuber yield as well as yield constituents of potato varieties (Table 3). Among the planting dates, the crop sown on (D_2, 22 October) showed successive increments in yield attributes, viz. tubers/plant, tuber weight (g/tuber), tuber yield/plant (g), tuber yield (tonnes/ha), biological yield (tonnes/ha) and harvest index (%). The

Table 2. Effect of planting dates on number of stem/hill and leaf area index of potato varieties at various phenophases (pooled data of 2 years)

Treatment	Number of stems/hill					Leaf-area index				
	Emergence	Stolonization	Tuber initiation	Tuber bulking	Physiological maturity	Emergence	Stolonization	Tuber initiation	Tuber bulking	Physiological maturity
Date of planting										
D_1, 8 October	1.54	9.99	11.8	12.8	13.6	0.58	1.32	3.10	3.60	1.74
D_2, 22 October	2.53	11.4	14.8	15.8	16.1	0.73	1.90	3.95	4.32	2.33
D_3, 4 November	1.24	9.25	10.8	11.7	12.4	0.49	1.48	2.83	3.31	1.47
D_4, 15 November	0.72	8.28	9.60	10.2	10.8	0.23	0.89	1.76	2.86	1.19
SEm±	0.16	0.37	0.68	0.52	0.32	0.05	0.14	0.15	0.12	0.11
CD (P=0.05)	0.53	1.22	2.22	1.69	1.05	0.15	0.47	0.50	0.41	0.34
Varieties										
V_1, 'Kufri Bahar'	1.46	9.66	11.5	12.1	13.4	0.46	1.40	2.94	3.61	1.62
V_2, 'Kufri Pushkar'	1.94	10.8	13.6	14.1	14.9	0.76	1.72	3.71	4.24	2.11
V_3, 'Kufri Surya'	1.13	8.73	10.1	11.1	11.4	0.29	1.07	2.07	2.79	1.28
SEm±	0.12	0.27	0.26	0.51	0.34	0.05	0.10	0.10	0.09	0.09
CD (P=0.05)	0.35	0.80	0.78	NS	1.01	0.15	0.29	0.31	0.27	0.25

*NS, Treatment difference not significant

maximum values of these parameters were observed in D_2 which was significantly superior to D_1 but remained statistically at par with D_3 during both the years. The effect of planting dates with varieties revealed that, crop sown on 22 October (D_2, 11.7) resulted in the highest (numbers of tubers per plant) followed by D_1 (11.1), D_3 (9.46) and D_4 (8.89). It reduced significantly with the delay in sowing at different sowing environment. Among the varieties, higher numbers of tubers/plant were recorded at Kufri Pushkar (12.3) followed by 'Kufri Bahar' (10.4) and 'Kufri Surya' (8.13) at harvesting. The variation in tubers/plant was significant among the varieties. The planting of crop on 22 October recorded the highest tuber weight (139 g/tuber) as compared to the other dates; the tuber weight was significantly higher than recorded under D_3 and D_4. However, it was on a par with D_2 (Table 3). Among the varieties, 'Kufri Pushkar' (131 g/tuber) attained the highest tuber weight as compared to 'Kufri Bahar' (118 g/tuber) and 'Kufri Surya' (110 g/tuber). The tuber weight of 'Kufri Pushkar' was significantly higher than 'Kufri Surya' and statistically at par with 'Kufri Bahar'. The differences in tuber weight of 'Kufri Surya' and 'Kufri Bahar' was also non-significant. Maximum tuber yield/plant was recorded in D_2 (637 g) as compared to the other dates and lowest in D_4 (323 g) (Table 3). 'Kufri Pushkar' had significant higher tuber yield/plant (577 g) than 'Kufri Bahar' (474 g) and 'Kufri Surya' (489 g).

The crop sown on (D_2, 22 October) gave significantly the highest tuber and biological yield (21.9 tonnes/ha and 38.1 tonnes/ha) as compared to crops sown on other dates and it was lowest in crop sown in D_4 (23 November) being 16.5 tonnes/ha and 34.7 tonnes/ha. While analysis, 'Kufri Pushkar' had significant higher tuber yield (23.2 tonnes/ha and 41.5 tonnes/ha) as compared to 'Kufri Bahar' (18.0 tonnes/ha and 35.4 tonnes/ha) and 'Kufri Surya' (16.6 tonnes/ha and 33.1 tonnes/ha) during the 2016-17 and 2017-18 (Table 3). The tuber and biological yields among all the varieties differed significantly. The D_2 sown crop recorded the highest harvest index (58.1) as compared to D_1, D_3 and D_4 during the crop season 2016-17 and 2017-18 (Table 3). 'Kufri Pushkar' (56.2) had significantly higher harvest index as compared to 'Kufri Bahar' and' Kufri Surya' during 2016-17 and 2017-18. Thongam *et al*. (2017) also reported that, tubers/plant, tuber weight, tuber yield of potato were more in October 10 planting dates as compared to the other dates in Maharashtra region. Our results confirm the findings of Dua *et al*. (2021) and Kumar *et al*. (2015) in potato crop. Planting time and varieties influenced the yield and yield attributes significantly in the forms of delayed sowing of potato with promising varieties leads to reduction in size and quality of tubers.

Table 3. Effect of planting dates on dry matter accumulation at various phenophases and yield and yield attributes of potato (pooled data of 2 years)

Treatment	Dry-matter (g/plant)					Yield and yield attributes				
	Emergence	Stolonization	Tuber initiation	Tuber bulking	Physiological maturity	No of tubers/ plant	Tuber weight (g/tuber)	Tuber yield/plant (g)	Tuber yield (tonnes/ha)	Biological yield (tonnes/ha)	Harvest index (%)
Date of planting											
D_1, 8 October	1.54	9.99	11.8	12.8	13.6	11.1	129	585	20.2	36.5	55.9
D_2, 22 October	2.53	11.4	14.8	15.8	16.1	11.6	139	637	21.9	38.02	58.1
D_3, 4 November	1.24	9.25	10.8	11.7	12.4	9.46	116	509	18.6	35.5	52.6
D_4, 15 November	0.72	8.28	9.60	10.2	10.8	8.88	95.0	323	16.5	34.7	47.4
SEm±	0.16	0.37	0.68	0.52	0.32	0.26	4.21	44	0.58	0.83	0.94
CD (P=0.05)	0.53	1.22	2.22	1.69	1.05	0.85	13.6	13	1.90	2.70	2.94
Varieties											
V_1, 'Kufri Bahar'	1.46	9.66	11.5	12.1	13.4	10.4	118	474	18.0	35.4	51.5
V_2, 'Kufri Pushkar'	1.94	10.8	13.6	14.1	14.9	12.2	131	577	23.2	41.5	56.2
V_3, 'Kufri Surya'	1.13	8.73	10.1	11.1	11.4	8.13	110	489	16.6	33.1	49.9
SEm±	0.12	0.27	0.26	0.51	0.34	0.28	2.86	17.5	0.42	0.79	0.96
CD (P=0.05)	0.35	0.80	0.78	NS	1.01	0.82	8.42	NS	1.26	2.32	2.88

*NS, Treatment difference not significant

Table 4. Pooled data of two years correlation coefficient between weather variables and growth and its yield parameters of potato

Weather variable	Plant height	Leaves/ plant	Stems/ hill	Leaf area index	Dry-matter accumulation	Tuber yield	Biological yield
Tmax	-0.46	-0.52*	-0.27	-0.54*	-0.36	0.55	0.38
Tmin	-0.35	-0.67*	-0.72*	-0.62*	-0.28	0.62**	0.45
RHm	0.24	0.35	0.36	0.50	-0.34	0.42	0.57
RHe	0.71	0.53	0.55	0.59*	0.00	0.72*	0.33
WS	0.61*	0.56*	-0.60	0.41	0.63*	-0.56*	0.72*
SSH	0.21	-0.56	0.34	-0.26	0.38	-0.85**	0.40
PE	0.14	-0.19	0.26	-0.45	0.29	0.48	0.37
Rainfall	0.46*	0.47	0.83**	0.44	0.45	0.80*	0.62*
RD	0.35*	0.42	0.78*	0.39	0.44*	0.50	0.77*

*significant at P=0.05, **significant at P=0.01

Tmax, maximum temperature; Tmin, minimum temperature; RHm, morning relative humidity; RHe, evening relative humidity; WS, wind speed; BSS, bright sunshine hours; Evap, rate of evaporation and RD, rainy day

Correlation

The plant height was significant positively correlated with wind speed, rainfall and rainy days, whereas other weather parameters negatively. The vegetative growth does not prefer higher temperatures, as the number of leaves/ plant was significant negatively correlated with maximum and minimum temperatures, whereas significantly positive with wind speed (Table 4). The number of stems/hill showed significantly positive correlation with rainfall and rainy days. Leaf area index was significantly negatively correlated with maximum and minimum temperature, wind speed, rainfall and rainy day, while other weather parameters was positively correlated with leaf area index (Table 4). The accumulation of dry matter showed significant positive correlation with wind speed and rainy days. The well-distributed rain favoured the dry-matter accumulation. Tuber yield was significantly positively correlated with minimum temperature, evening relative humidity and rainfall, whereas it was negatively correlated with wind speed and sunshine hours. The biological yield was significantly positively correlated with wind speed, rainfall and rainy day, whereas it was negatively with wind speed and sunshine hours.

It was concluded that in 22 October planting resulted in higher tuber yield as compared to planting in November. Among the treatments, 22 October observed highest tuber (21.90 tonnes/ha) and haulm yields (38.02 tonnes/ha) because it produced more plant height; more number of leaves per plant hence it produced more LAI, biomass accumulation then ultimately produced maximum tuber and haulm yield and further significantly improved yield attributes as compared to crop sown on other dates. While, among the varieties, 'Kufri Pushkar' produced highest tuber yield with improved yield attributes as compared to 'Kufri Bahar' and 'Kufri Surya'. Plant height, dry-matter accumulation and biological yield were positively correlated with wind speed, rainfall and rainy days. The number of leaves/plant and LAI was significantly negatively correlated with maximum and minimum temperatures whereas it showed significant positive correlations with wind speed. Evening relative humidity was also positively correlated with LAI and tuber yield of potato. Research should also be further strengthened to develop agronomic adaptation including rescheduling of plating dates for potato cultivation as a strategy for meeting the challenges posed by the climate change.

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