SUPPLEMENTARY MATERIAL

Effect of yeast and mineral fertilisers on the level attack of the solenopsis mealybug and productivity okra plants

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Table S1. Analysis of the soil at trial location

Parameter		Value/feature
Depth of the soil (cm)		90
Soil texture		slay loam
Chemical analysis	pH value	7.80
	total solids (%)	0.12
	calcium carbonate (%)	4.50
	macro elements (ppm)	
	concentration of N	7.00
	concentration of P	15.00
	concentration of K	372.00
	micro elements (ppm)	
	concentration of Fe	3.80
	concentration of Cu	0.10
	concentration of Mn	2.00
	concentration of Zn	1.16
	anions (meq·dm^{-3})	
	Cl^-	1.40
	So_4^{2-}	0.83
	HCo_{3-}	1.60
	Co_3^{2-}	0.11
	cations (meq·dm^{-3})	
	Na^+	2.70
	K^+	0.10
	Ca^{2+}	0.48
	Mg^{2+}	0.66

Source: own study.

Table S2. Monthly number (mean ±*SE*) of *Phenacoccus solenopsis* individuals per sample as affected by nitrogen and phosphorus fertiliser rates, yeast (without and with) and their interactions in okra plants during the first growing season (2021)

Treatment		Number (mean ±*SE*) of *Phenacoccus solenopsis* individuals per 10 leaves						$LSD_{0.05}$	*CV* (%)
		March	April	May	June	July	average		
Y0		16.88 ±3.48	81.75 ±5.67	126.42 ±8.00	173.64 ±8.06	145.76 ±10.48	108.89 ±8.07	11.41*	6.34
Y1		18.27 ±3.74	85.55 ±4.92	144.86 ±7.37	184.40 ±8.38	155.31 ±10.99	117.68 ±8.57	12.70*	6.53
$LSD_{0.05}$		1.20*	2.84*	3.47*	9.91*	10.87*	5.52*	–	
T1		11.63 ±2.33	48.17 ±2.73	85.33 ±3.97	105.42 ±5.30	90.38 ±6.42	68.18 ±2.29	9.03*	8.01
T2		14.25 ±2.87	64.42 ±3.91	105.04 ±6.35	139.38 ±5.85	114.88 ±8.14	87.59 ±3.49	12.28*	8.48
T3		15.33 ±3.30	75.04 ±4.62	121.79 ±6.98	160.88 ±6.79	133.96 ±9.25	101.40 ±3.55	10.92*	6.52
T4		16.67 ±3.53	81.17 ±5.11	129.63 ±7.44	173.33 ±8.43	145.54 ±10.52	109.27 ±3.78	15.48*	8.58
T5		18.79 ±3.88	89.96 ±5.15	146.92 ±7.80	195.04 ±9.39	164.08 ±12.18	122.96 ±3.78	19.16*	9.43
T6		21.92 ±4.48	107.71 ±8.14	171.83 ±11.44	228.42 ±12.71	192.79 ±14.75	144.53 ±4.02	26.99*	8.29
T7		24.46 ±4.90	119.08 ±7.63	188.92 ±10.47	250.71 ±11.59	212.13 ±14.73	159.06 ±7.09	18.10*	6.89
$LSD_{0.05}$		1.52*	10.41*	11.80*	14.47*	11.57*	9.19*	–	
Y0	T1	11.67 ±2.31	47.75 ±2.70	85.08 ±3.78	104.92 ±5.22	90.08 ±6.35	67.90 ±4.91	8.30*	7.40
	T2	13.25 ±2.65	57.58 ±3.10	102.17 ±5.44	126.50 ±6.73	107.75 ±8.06	81.45 ±6.01	14.80*	11.00
	T3	15.17 ±3.31	77.08 ±6.47	112.92 ±8.70	161.08 ±7.88	130.33 ±8.50	99.32 ±7.45	11.32*	6.90
	T4	16.25 ±3.53	77.00 ±4.51	138.75 ±7.21	169.17 ±8.37	144.42 ±10.52	109.12 ±8.08	16.23*	9.00
	T5	17.17 ±3.53	84.08 ±6.83	122.92 ±8.83	178.67 ±8.86	149.50 ±11.13	110.47 ±8.38	16.30*	8.93
	T6	21.17 ±4.30	109.25 ±10.82	154.75 ±12.73	231.00 ±15.35	192.92 ±16.19	141.82 ±11.35	28.99*	12.37
	T7	23.50 ±4.82	119.50 ±11.18	168.33 ±12.83	244.17 ±12.06	205.33 ±14.32	152.17 ±11.48	24.70*	9.82
Y1	T1	11.58 ±2.36	48.58 ±2.82	85.58 ±4.18	105.92 ±5.41	90.67 ±6.49	68.47 ±4.98	10.11*	8.93
	T2	15.25 ±3.10	71.25 ±6.19	107.92 ±8.25	152.25 ±7.46	122.00 ±8.32	93.73 ±7.04	13.94*	9.00
	T3	15.50 ±3.29	73.00 ±4.33	130.67 ±6.20	160.67 ±8.24	137.58 ±10.07	103.48 ±7.66	15.36*	8.98
	T4	17.08 ±3.53	85.33 ±7.37	120.50 ±8.60	177.50 ±9.05	146.67 ±10.70	109.42 ±8.27	16.45*	9.10
	T5	20.42 ±4.23	95.83 ±6.09	170.92 ±7.78	211.42 ±10.55	178.67 ±13.25	135.45 ±10.02	25.22*	11.27
	T6	22.67 ±4.68	106.17 ±7.47	188.92 ±11.28	225.83 ±11.34	192.67 ±13.62	147.25 ±10.86	18.59*	7.64
	T7	25.42 ±5.01	118.67 ±6.73	209.50 ±10.15	257.25 ±12.80	218.92 ±15.36	165.95 ±12.13	20.10*	7.33
Average		17.58 ±3.61	83.65 ±5.11	135.64 ±7.61	179.02 ±8.15	150.54 ±10.72	113.28 ±3.54	11.77*	6.29
$LSD_{0.05}$		2.15*	14.73*	16.69*	20.46*	16.36*	13.00*	–	
CV (%)		19.65	6.07	6.13	8.71	8.31	6.81	–	

Explanations: *SE* = standard error; least significant difference (*LSD*) between the different rates of mineral fertiliser, yeast and inspected times at 0.05 level = 17.56** (** highly significant at $P \leq 0.01$; * significant at $P \leq 0.05$) and the percentage of coefficient of variation (*CV*) between them = 9.67%; Y0 = without yeast, Y1 = with yeast, T1 = unfertilised soil, T2 = 190 kg N·ha^{-1} with 107 kg P·ha^{-1}, T3 = 190 kg N·ha^{-1} with 143 kg P·ha^{-1}, T4 = 238 kg N·ha^{-1} with 107 kg P·ha^{-1}, T5 = 238 kg N·ha^{-1} with 143 kg P·ha^{-1}, T6 = 286 kg N·ha^{-1} with 107 kg P·ha^{-1}, T7 = 286 kg N·ha^{-1} with 143 kg P·ha^{-1}.

Source: own study.

Table S3. Monthly number (mean ±*SE*) of *Phenacoccus solenopsis* individuals per sample as affected by nitrogen and phosphorus fertiliser rates, yeast (without and with) and their interactions in okra plants during the second growing season (2022)

Treatment		Number (mean ±*SE*) of *Phenacoccus solenopsis* individuals per 10 leaves						$LSD_{0.05}$	*CV* (%)
		March	April	May	June	July	average		
Y0		19.24 ±3.75	90.69 ±6.39	145.81 ±10.51	204.64 ±4.21	161.25 ±12.64	124.33 ±9.29	13.53*	6.58
Y1		20.49 ±3.99	94.74 ±5.69	156.48 ±8.40	221.01 ±5.26	174.80 ±13.86	133.50 ±9.94	14.87*	6.74
$LSD_{0.05}$		0.47*	2.27*	9.21*	1.97*	6.37*	3.26*	–	
T1		12.96 ±2.45	53.17 ±3.05	88.75 ±3.74	126.67 ±2.88	100.00 ±7.72	76.31 ±5.59	11.27*	8.94
T2		16.08 ±3.04	71.67 ±4.36	128.04 ±10.31	153.33 ±3.07	127.42 ±9.94	99.31 ±7.32	14.90*	9.08
T3		17.96 ±3.58	83.33 ±5.06	138.17 ±8.68	188.29 ±2.12	150.49 ±116.2	115.65 ±8.50	14.66*	7.67
T4		18.79 ±3.75	89.54 ±5.52	143.33 ±8.55	208.75 ±3.68	162.96 ±12.57	124.68 ±9.31	19.64*	9.53
T5		21.75 ±4.11	100.38 ±6.42	160.92 ±10.07	234.67 ±7.05	182.54 ±14.83	140.05 ±10.59	18.42*	7.96
T6		25.08 ±4.78	119.29 ±9.15	189.92 ±13.89	273.04 ±13.74	214.00 ±19.00	164.27 ±12.86	37.40*	13.78
T7		26.42 ±5.42	131.63 ±8.76	208.88 ±13.32	305.04 ±8.59	238.75 ±19.20	182.14 ±13.84	23.27*	7.73
$LSD_{0.05}$		1.60*	12.53*	20.74*	38.64*	23.83*	18.98*	–	
Y0	T1	12.92 ±2.45	52.92 ±2.98	88.00 ±3.76	125.83 ±2.85	99.50 ±7.71	75.83 ±5.56	3.83*	8.74
	T2	14.75 ±2.84	63.50 ±3.58	123.75 ±8.53	131.42 ±3.62	115.83 ±9.10	89.85 ±6.55	5.31*	10.23
	T3	17.67 ±3.54	85.75 ±7.19	140.17 ±13.15	186.25 ±2.57	148.33 ±11.39	115.63 ±8.76	5.56*	8.32
	T4	18.25 ±3.73	84.67 ±4.95	143.17 ±6.16	201.83 ±4.70	161.08 ±12.20	121.80 ±9.04	6.53*	9.28
	T5	20.08 ±3.76	94.25 ±7.81	143.67 ±11.69	217.42 ±2.89	165.42 ±12.60	128.17 ±9.74	6.67*	9.01
	T6	24.75 ±4.67	121.33 ±11.80	183.00 ±17.29	268.33 ±13.36	206.92 ±18.26	160.87 ±12.82	14.68*	15.81
	T7	26.25 ±5.34	132.42 ±12.85	198.92 ±18.73	301.42 ±15.67	231.67 ±21.11	178.13 ±14.47	15.03*	14.61
Y1	T1	13.00 ±2.45	53.42 ±3.13	89.50 ±3.73	127.50 ±2.91	100.50 ±7.74	76.78 ±5.63	4.10*	9.24
	T2	17.42 ±3.26	79.83 ±6.60	132.33 ±12.53	175.25 ±2.57	139.00 ±10.81	108.77 ±8.23	5.35*	8.52
	T3	18.25 ±3.63	80.92 ±4.76	136.17 ±5.74	190.33 ±4.42	152.65 ±11.86	115.66 ±8.52	6.09*	9.12
	T4	19.33 ±3.79	94.42 ±8.06	143.50 ±11.95	215.67 ±2.85	164.83 ±12.96	127.55 ±9.75	7.27*	9.88
	T5	23.42 ±4.48	106.50 ±7.88	178.17 ±10.94	251.92 ±14.31	199.67 ±18.44	151.93 ±12.00	12.71*	14.49
	T6	25.42 ±4.90	117.25 ±8.85	196.83 ±12.03	277.75 ±15.77	221.08 ±20.19	167.67 ±13.26	13.91*	14.37
	T7	26.58 ±5.52	130.83 ±7.58	218.83 ±9.24	308.67 ±7.37	245.83 ±18.92	186.15 ±13.87	10.08*	9.38
Average		19.86 ±3.87	92.71 ±5.84	151.14 ±9.32	212.83 ±4.60	168.02 ±13.25	128.91 ±4.13	13.94*	6.54
$LSD_{0.05}$		2.27*	17.72*	29.33*	54.65*	33.70*	26.84*	–	
CV (%)		21.15	5.98	7.84	5.11	10.57	12.35	–	

Explanations: *SE* = standard error; least significant difference (*LSD*) between the different rates of mineral fertiliser, yeast and inspected times at 0.05 level = 25.65** (** highly significant at $P \leq 0.01$; * significant at $P \leq 0.05$) and the percentage of coefficient of variation (*CV*) between them = 12.41%; Y0, Y1, T1, T2, T3, T4, T5, T6, T7 as in Tab. S2.

Source: own study.

Table S4. Averages of vegetative growth as influenced by nitrogen and phosphorus fertiliser rates, yeast (without and with) and their interactions in okra plants during the two growing seasons (2021 and 2022); each value is the mean of the three different replicates ±*SE*: maize yield and its components

Treat-ment		Mean of ±*SE*					
		plant height (cm)		No. of branches per plant		No. of green leaves per plant	
		2021	2022	2021	2022	2021	2022
Y0		166.32 ±1.66	167.66 ±1.49	5.70 ±0.23	6.10 ±0.25	28.29 ±0.67	28.95 ±0.42
Y1		175.51 ±2.33	176.84 ±1.69	6.30 ±0.36	6.70 ±0.30	28.86 ±0.54	29.52 ±0.83
$LSD_{0.05}$		3.48*	4.12*	NS	NS	NS	NS
T1		142.11 ±1.99	143.45 ±0.66	3.97 ±0.42	4.37 ±0.10	22.33 ±0.88	23.00 ±0.58
T2		195.17 ±2.61	196.50 ±1.92	7.35 ±0.26	7.75 ±0.45	33.67 ±0.60	34.33 ±0.88
T3		190.79 ±0.59	192.12 ±1.11	7.00 ±0.58	7.40 ±0.40	32.33 ±0.88	33.00 ±0.58
T4		182.27 ±3.32	183.60 ±4.41	6.77 ±0.12	7.17 ±0.36	31.00 ±0.58	31.67 ±0.60
T5		171.27 ±2.80	172.61 ±2.26	6.42 ±0.12	6.82 ±0.52	28.67 ±0.44	29.33 ±0.67
T6		161.12 ±4.09	162.46 ±3.47	5.48 ±051	5.88 ±0.21	27.00 ±0.58	27.67 ±0.33
T7		153.67 ±3.40	155.00 ±2.33	5.02 ±0.62	5.42 ±0.27	25.00 ±0.73	25.67 ±0.60
$LSD_{0.05}$		5.57*	6.10*	0.67*	0.63*	0.82*	0.89*
Y0	T1	141.10 ±2.37	142.44 ±1.20	3.73 ±0.47	4.13 ±0.07	22.00 ±1.15	22.67 ±0.67
	T2	190.68 ±3.14	192.01 ±2.25	7.00 ±0.58	7.40 ±0.40	33.33 ±0.67	34.00 ±1.15
	T3	185.07 ±2.06	186.40 ±3.37	6.77 ±0.23	7.17 ±0.55	32.00 ±1.15	32.67 ±0.67
	T4	173.97 ±2.86	175.30 ±3.68	6.53 ±0.23	6.93 ±0.63	30.67 ±0.67	31.33 ±0.33
	T5	163.76 ±3.26	165.09 ±2.42	6.07 ±0.23	6.47 ±0.55	28.67 ±0.33	29.33 ±0.67
	T6	157.03 ±3.14	158.36 ±3.23	5.13 ±0.47	5.53 ±0.07	26.67 ±0.67	27.33 ±0.33
	T7	152.66 ±2.25	153.99 ±1.44	4.67 ±0.62	5.07 ±0.27	24.67 ±0.88	25.33 ±0.67
Y1	T1	143.12 ±1.95	144.45 ±0.96	4.20 ±0.40	4.60 ±0.21	22.67 ±0.88	23.33 ±0.67
	T2	199.65 ±2.14	200.99 ±1.75	7.70 ±0.40	8.10 ±0.57	34.00 ±0.58	34.67 ±1.20
	T3	196.51 ±2.75	197.85 ±1.48	7.23 ±0.23	7.63 ±0.35	32.67 ±0.67	33.33 ±0.67
	T4	190.57 ±4.09	191.90 ±5.31	7.00 ±0.40	7.40 ±0.21	31.33 ±1.15	32.00 ±1.15
	T5	178.79 ±2.50	180.12 ±2.37	6.77 ±0.23	7.17 ±0.55	28.67 ±0.67	29.33 ±0.67
	T6	165.22 ±5.60	166.55 ±4.63	5.83 ±0.6	6.23 ±0.41	27.33 ±0.33	28.00 ±0.58
	T7	154.67 ±4.58	156.01 ±3.42	5.37 ±0.62	5.77 ±0.27	25.33 ±0.67	26.00 ±1.15
Average		170.91 ±3.05	172.25 ±3.04	6.00 ±0.21	6.40 ±0.20	28.57 ±0.61	29.24 ±0.62
$LSD_{0.05}$		7.88*	9.24*	0.95*	0.90*	1.26*	1.28*
CV (%)		2.73	2.71	9.38	8.31	2.61	2.55

Explanations: *LSD* = least significant difference, *CV* = coefficient of variation, NS = not significant, * significant at $P \leq 0.05$, ** highly significant at $P \leq 0.01$, Y0, Y1, T1, T2, T3, T4, T5, T6, T7 as in Tab. S2.

Source: own study.

Table S5. Averages of yield traits and its components as influenced by nitrogen and phosphorus fertiliser rates, yeast (without and with) and their interactions in okra plants during the two growing seasons (2021 and 2022); each value is the mean of the three different replicates ±*SE*

Treatment		No. of fresh fruits per plant		Mean fresh weight of fruit (g)		Yield (kg) per plot	
		2021	2022	2021	2022	2021	2022
Y0		20.52 ±0.21	20.86 ±0.38	2.82 ±0.01	2.89 ±0.06	1.84 ±0.01	1.91 ±0.07
Y1		21.81 ±0.25	22.41 ±0.22	3.00 ±0.03	3.07 ±0.07	1.96 ±0.02	2.02 ±0.08
$LSD_{0.05}$		0.74*	0.78*	0.10*	0.04*	0.06*	0.04*
T1		18.00 ±0.29	18.33 ±0.17	2.48 ±0.03	2.54 ±0.05	1.62 ±0.02	1.68 ±0.06
T2		24.00 ±0.29	24.33 ±0.60	3.30 ±0.04	3.37 ±0.09	2.15 ±0.03	2.22 ±0.09
T3		23.33 ±0.67	23.67 ±0.33	3.21 ±0.04	3.27 ±0.07	2.09 ±0.03	2.16 ±0.07
T4		22.67 ±0.33	23.00 ±0.58	3.12 ±0.05	3.18 ±0.11	2.03 ±0.04	2.10 ±0.10
T5		21.33 ±0.67	21.67 ±0.33	2.93 ±0.04	3.00 ±0.07	1.91 ±0.03	1.98 ±0.07
T6		19.83 ±0.60	20.17 ±0.33	2.73 ±0.07	2.80 ±0.06	1.78 ±0.04	1.85 ±0.06
T7		19.00 ±0.76	19.33 ±0.17	2.61 ±0.06	2.68 ±0.01	1.71 ±0.03	1.77 ±0.04
$LSD_{0.05}$		0.81*	0.87*	0.11*	0.06*	0.07*	0.05*
Y0	T1	17.67 ±0.58	18.00 ±0.33	2.43 ±0.03	2.50 ±0.03	1.59 ±0.01	1.65 ±0.08
	T2	23.33 ±1.00	23.67 ±0.67	3.21 ±0.04	3.27 ±0.06	2.09 ±0.03	2.16 ±0.07
	T3	22.33 ±0.58	22.67 ±0.33	3.07 ±0.04	3.14 ±0.07	2.00 ±0.04	2.07 ±0.06
	T4	21.67 ±0.33	22.00 ±0.58	2.98 ±0.05	3.05 ±0.11	1.94 ±0.03	2.01 ±0.10
	T5	20.33 ±0.33	20.67 ±0.33	2.80 ±0.04	2.86 ±0.06	1.82 ±0.03	1.89 ±0.06
	T6	19.33 ±0.58	19.67 ±0.67	2.66 ±0.04	2.73 ±0.07	1.74 ±0.03	1.80 ±0.07
	T7	19.00 ±1.00	19.33 ±0.33	2.61 ±0.07	2.68 ±0.04	1.71 ±0.04	1.77 ±0.06
Y1	T1	18.33 ±0.33	18.67 ±0.33	2.52 ±0.04	2.59 ±0.07	1.65 ±0.03	1.71 ±0.05
	T2	24.67 ±0.58	25.00 ±0.58	3.39 ±0.05	3.46 ±0.11	2.21 ±0.04	2.28 ±0.10
	T3	24.33 ±0.58	24.67 ±0.33	3.34 ±0.04	3.41 ±0.07	2.18 ±0.03	2.25 ±0.07
	T4	23.67 ±0.33	24.00 ±0.58	3.25 ±0.05	3.32 ±0.11	2.12 ±0.04	2.19 ±0.10
	T5	22.33 ±0.58	22.67 ±0.33	3.07 ±0.04	3.14 ±0.07	2.00 ±0.03	2.07 ±0.07
	T6	20.33 ±1.00	20.67 ±0.67	2.80 ±0.11	2.86 ±0.08	1.82 ±0.07	1.89 ±0.06
	T7	19.00 ±0.33	19.33 ±0.67	2.61 ±0.07	2.68 ±0.04	1.71 ±0.04	1.77 ±0.05
Average		21.17 ±0.36	21.50 ±0.25	2.91 ±0.02	2.98 ±0.05	1.90 ±0.03	1.97 ±0.04
$LSD_{0.05}$		1.14*	1.18*	0.16*	0.08*	0.10*	0.07*
CV (%)		3.21	3.16	3.19	1.60	3.19	2.23

Explanations: *LSD* = least significant difference, *CV* = coefficient of variation, * significant at $P \leq 0.05$, ** highly significant at $P \leq 0.01$, Y0, Y1, T1, T2, T3, T4, T5, T6, T7 as in Tab. S2.
Source: own study.