

Industry Survey Results: Majsztrik, J.M., A.G. Ristvey, D.S. Ross and J.D. Lea-Cox, 2018. Comparative Water and Nutrient Application Rates among Ornamental Operations in Maryland. HortScience 53(9):1364–1371.

Plant Density:

Quartile	Avg plant density (no. of plants/ha)		
	Greenhouse	Container	Field
Lower	107,537 ± 27,806	19,768 ± 4,407	1,794 ± 301
Middle	242,454 ± 234,130	47,938 ± 37,928	1,794 ± 161
Upper	863,563 ± 7,769,821	154,941 ± 1,941,780	2,152 ± 21,569

Irrigation Water Use:

Quartile	Greenhouse (L/ha/irrigation)	Container (L/ha/irrigation)		Field (L/ha/irrigation)
		Spring/fall	Summer	
Lower	40,820 ± 11,093	79,215 ± 22,497	91,923 ± 24,740	32,597 ± 10,607
Middle	65,193 ± 12,703	132,921 ± 77,031	228,652 ± 95,081	42,783 ± 34,301
Upper	86,555 ± 102,650	325,615 ± 568,962	356,149 ± 664,926	128,349 ± 113,043

Large SDS indicate that practices differed substantially among management units and operations.

Types of Fertilizers:

Greenhouse		Container		Field	
N:P ₂ O ₅ :K ₂ O ratio	No. of MUs	N:P ₂ O ₅ :K ₂ O ratio	No. of MUs	N:P ₂ O ₅ :K ₂ O ratio	No. of MUs
20–10–20	40	18–6–8	15	0–0–0	7
17–5–17	38	18–5–11	13	20–0–0	4
20–20–20	12	18–6–12	13	8–0–0	3
20–7–20	12	17–7–8	12	10–10–10	3
20–5–20	11	19–5–9	12	15.5–0–0	3
17–5–24	10	12–5–6	9	4–6–4	2
13–13–13	8	13–13–13	9	10–20–10	2
22–0–22	8	17–7–12	9	12–3–10	2
15–5–15	7	17–7–14	7	16–8–8	2
14–14–14	6	18–5–9	7	5–3–3	1

Quick Conversions:

- 1000 Liter / Ha = 107 Gal / Acre
- 1 Kg / Ha = 0.89 lb / Acre

Greenhouse Nutrient Application Rates

Plant type/container size	No. of MUs	Quartile value	No. of plants/ha	NPK application rate* (kg/ha/yr)			NPK application rate per 1,000 plants (kg)			Equivalent to 1 yr of growing 1,000 plants (kg)		
				N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
Annuals/10–11 cm	13	Lower	790,734	57	18	57	0.07	0.03	0.07	0.42	0.14	0.42
		Middle	858,147	112	37	112	0.13	0.05	0.13	0.68	0.25	0.56
		Upper	994,101	173	73	176	0.25	0.11	0.21	0.91	0.46	0.87
Annuals/20–30 cm	9	Lower	107,639	87	22	87	0.57	0.17	0.57	2.71	0.88	2.71
		Middle	134,783	88	26	88	0.81	0.22	0.81	3.42	1.26	3.42
		Upper	153,484	88	26	88	0.95	0.25	1.10	4.46	1.48	4.46
Annuals flats (e.g., 606, 1204)	15	Lower	736,160	59	18	59	0.05	0.02	0.05	0.21	0.07	0.21
		Middle	1,490,492	74	38	74	0.06	0.03	0.06	0.31	0.16	0.29
		Upper	2,554,543	176	79	162	0.11	0.09	0.11	0.54	0.42	0.54
Hanging baskets/25 cm	13	Lower	79,073	90	36	105	1.06	0.55	1.06	5.26	1.17	5.44
		Middle	107,436	206	129	194	3.92	1.63	3.64	19.52	6.81	19.52
		Upper	147,531	579	258	579	5.96	2.09	5.54	28.59	9.23	25.86
Hanging baskets/30–36 cm	6	Lower	78,715	29	11	29	0.37	0.14	0.37	2.46	0.94	2.46
		Middle	80,754	29	11	29	0.38	0.15	0.38	2.52	0.97	2.52
		Upper	88,250	54	16	54	0.61	0.19	0.61	3.32	1.03	3.32
Chrysanthemums/4–8 L	7	Lower	62,456	135	202	135	0.99	1.27	0.99	2.22	2.55	2.22
		Middle	107,639	188	349	188	2.40	2.40	2.40	8.26	8.26	8.26
		Upper	175,046	484	535	484	5.01	6.54	5.01	10.03	13.22	10.03
Poinsettias/8–18 cm	11	Lower	90,942	121	39	125	0.74	0.29	0.74	1.87	0.73	1.91
		Middle	154,999	191	196	241	1.48	0.74	1.48	2.96	2.25	2.96
		Upper	275,755	674	288	674	6.01	2.25	6.01	12.61	4.20	12.61
Poinsettias/20–25 cm	12	Lower	26,910	112	35	112	2.39	1.01	2.96	4.77	2.35	6.06
		Middle	62,021	256	110	262	4.78	2.61	4.85	8.90	5.64	10.62
		Upper	84,491	406	229	498	7.96	3.92	7.96	17.29	7.51	17.29

*Not based on plant density.

Note: One kilogram per 1,000 plants equates to 1 g/plant.

Quick Conversion: 1 Kg / Ha = 0.892 lb / Acre

Maryland Low Risk Nutrient Application Rates:

- N: < 315 lb N / acre / cycle
- P₂O₅: < 104 lb P₂O₅ / acre / cycle

Container Nursery Nutrient Application Rates

Plant type/container size	No. of MUs	Quartile value	No. of plants/ha	NPK application rate ² (kg/ha/yr)			NPK application rate per 1,000 plants (kg)		
				N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
Chrysanthemum/4-8 L	3	Lower	19,768	33	11	21	1.40	0.53	0.73
		Middle	21,498	62	17	38	2.55	0.80	1.20
		Upper	34,665	92	34	48	2.72	0.93	1.48
Woody perennials/1-4 L	22	Lower	107,639	219	94	130	2.05	0.68	1.08
		Middle	209,297	577	160	280	3.01	1.21	1.62
		Upper	271,182	915	388	593	3.62	1.72	2.66
Woody perennials/8 L	12	Lower	65,727	116	104	67	2.48	1.24	1.04
		Middle	85,991	386	161	217	4.31	1.96	2.61
		Upper	194,130	709	273	382	5.27	2.49	3.44
Woody perennials/11 L	22	Lower	34,444	220	95	146	7.74	2.06	3.40
		Middle	46,406	667	185	340	10.58	4.24	7.70
		Upper	92,569	975	376	498	14.71	5.91	10.20
Woody perennials/19 L	21	Lower	21,528	229	72	134	12.60	4.55	6.00
		Middle	26,910	372	122	176	15.31	5.15	10.21
		Upper	29,302	756	252	389	19.66	6.20	11.16
Woody perennials/27 L	12	Lower	12,120	193	63	112	18.50	5.86	8.35
		Middle	14,883	422	135	234	29.20	9.65	17.87
		Upper	17,859	544	183	275	37.19	10.61	18.81
Woody perennials/38 L	6	Lower	6,798	405	118	187	38.78	11.45	17.96
		Middle	8,372	800	241	433	97.54	28.66	54.92
		Upper	11,362	930	258	568	139.40	38.72	85.19
Woody perennials/57 L	6	Lower	4,647	497	148	238	46.09	14.49	21.36
		Middle	7,367	752	251	334	69.93	21.57	32.83
		Upper	9,644	1,258	360	736	287.74	81.00	172.63

²Not based on plant density.
Note: One kilogram per 1,000 plants equates to 1 g/plant.

Quick Conversion: 1 Kg / Ha = 0.892 lb / Acre

Maryland Low Risk Nutrient Application Rates:

- N: < 315 lb N / acre / cycle
- P₂O₅: < 104 lb P₂O₅ / acre / cycle

Field Nursery Nutrient Application Rates

Plant type	No. of MUs	Quartile value	No. of plants/ha	NPK application rate (kg/ha/yr) ^z			NPK application rate/1,000 plants (kg)		
				N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
Deciduous trees and shrubs	6	Lower	1,794	20	0	0	8.40	0.00	0.00
		Middle	2,406	28	9	9	15.62	3.00	3.00
		Upper	2,722	34	21	21	18.10	10.01	10.01
Evergreen trees and shrubs	13	Lower	2,471	0	0	0	0.00	0.00	0.00
		Middle	4,377	7	0	0	2.39	0.00	0.00
		Upper	4,305	28	9	17	15.62	2.92	5.85
Mixed deciduous and evergreen trees and shrubs	73	Lower	1,794	38	9	9	18.46	4.71	4.70
		Middle	2,250	67	19	19	34.53	9.00	9.26
		Upper	2,152	107	26	26	57.29	13.88	14.28

^zNot based on plant density.
Note: One kilogram per 1,000 plants equates to 1 g/plant.

Quick Conversion: 1 Kg / Ha = 0.892 lb / Acre

Maryland Low Risk Nutrient Application Rates:

- N: < 315 lb N / acre / cycle
- P₂O₅: < 104 lb P₂O₅ / acre / cycle