

Echinacea purpurea

Starting Material	Seedling plugs - in our experience, all 'Bravado' and 'Magnus' seedlings eventually flowered and juvenility does not seem to pose a problem. Larger plants tend to bloom earlier.				
Response to cold treatment	Category	Cold slightly beneficial			
	Cold Response Time-to-flower Flower number	Cold hastens flowering by up to 2-3 weeks, but improves no other flowering characteristic. Cold-treated plants tend to be shorter but stems are less robust and more prone to flopping over in pot.			
	Recommendation	10-15 weeks cold			
Response to photoperiod	Category	LD* required (*Intermediate photoperiods required)			
	Photoperiod Response Time-to-flower, Flower number & Height	Without cold, plants grow as small rosettes and do not flower when photoperiods are <, or equal to, 12 h. Under 13 to 15 hours of light (optimum at 14 h), flowering is most rapid and uniform. Longer photoperiods decreased flowering percentage and delayed flowering. Short durations of NI (1 hour) were as effective as 14h. NI as short as 7.5 min induced flowering, plants were much shorter, but flowering was delayed by ~3 weeks. Flowering is not complete under a 4-h NI.			
	Recommended photoperiod for flowering	14 hours or 30 min to 1 h of NI. Shorter durations (7.5 or 15 min) of NI produce very attractive and compact flowering plants, and are most recommended if a delay in flowering and a reduced flowering percentage (80% vs. 100%) is acceptable.			
	Recommended photoperiod for bulking	10-12 hours, before cold treatment.			
Height Control	Natural Height	24-36" (60-90 cm) under 14 h or 1 h or longer of NI. Height increases with an increase in container size, and is generally shorter following cold.			
	Effective Growth Retardants	A-Rest, B-Nine, Cycocel and Sumagic were all effective. However, repeated applications are likely required, and most importantly, proper timing is essential for success - must apply before significant bolting has occurred.			
	Limited Induction	Several weeks of LD are required for flowering. Transferring plants to SD when plants begin to bolt decreases height by 27% to 32% for both 'Bravado' and 'Magnus'.			
Timing 'Bravado' 128-cell plugs 6-7 leaves no cold 14-15 h photoperiods	Temperature	17C 63F	20C 68F	23C 73F	26C 79F
	Days to VB	77	52	54	67
	Days VB to Flower	27	26	24	20
	Days to Flower	104	78	78	87
	Weeks to Flower	15	11	11	12.5
Timing 'Magnus' 128-cell plugs 4-5 leaves no cold 14-15 h photoperiods	Temperature	17C 63F	20C 68F	23C 73F	26C 79F
	Days to VB	125	75	67	73
	Days VB to Flower	31	26	23	23
	Days to Flower	156	101	90	96
	Weeks to Flower	22	14.5	13	14
Forcing Temperature	For both 'Bravado' and 'Magnus', force at 68 to 73F for the most complete and rapid flowering. Plants flower earlier when more mature plants are used. Flower number is greatest at 63F, but flowering is delayed. At cooler temperatures, plants develop very slowly. Flowering percentage was low at 79F and above.				
Nodes formed during forcing	Under the most inductive conditions, about 13 to 15 nodes (leaves) develop below the first flower. More nodes form under less favorable photoperiods.				
Production Notes	For successful container production, stem extension must be controlled by 1) frequent and timely growth retardant applications or 2) very short NI lighting (7.5 to 15 min) when photoperiods are short (9-12 h). Flowers naturally in late July if not given NI. Moderate to high light intensities are required for a high flowering percentage. True 'Magnus' is deeper pink in color and petals are less reflexed than 'Bravado', but getting the true 'Magnus' has proved elusive.				
Cultural Notes	We have frequently experienced problems with <i>Echinacea</i> when nutrients and/or pH is low. One of the more sensitive species to cultural problems. Avoid a low pH. Requires frequent irrigation once plants mature and begin to bolt. Slugs are reported to be potentially problematic. Have seen Japanese beetles feed on flower petals. Generally a very tough, sturdy plant in the landscape.				
Postharvest considerations	Plants last several weeks in flower, and are most appealing a few weeks after first flowering, when lateral buds develop. Flower size and color decrease with decreasing light levels.				
Related Plants	'Ovation Pink' - 50-cell plugs tested and found to have similar requirements.				