

# AERIAL/SURFACE SEEDING

When aerial seeding, consider the ideal planting window for the cover crop being planted. For example, radishes typically need 800-900 Growing Degree Days (GDD), or at least 4 - 6 weeks and preferably 8 - 10 weeks of growth prior to winter termination. That planting period needs to be taken into account so it coincides with the proper maturity stage of the crop in the field. Moisture or irrigation is critical when surface seeding to make up for the lack of seed-to-soil contact. When time could be a hurdle, aerial and “over-the-top” seedings offer a worthy alternative.

## Considerations:

Assuming seeding intervals match, the ideal time to aerial seed into our traditional cash crops are as follows:

<b>CORN</b>	When at least 50% of sunlight can penetrate to the soil surface
<b>SOYBEANS</b>	Leaf senescence typically, but that depends to some degree on row width and soybean architecture. Delaying applications into soybeans decreases seed-to-soil contact and increases the risk of poor moisture retention needed for maximizing germination.
<b>SUNFLOWERS</b>	Back of the seed head turns yellow

**When crop stage and the seeding calendar do not align, always weigh on the side of earlier applications, especially when a moisture event is forecasted or irrigation can be planned. It's better to have the cover crop seed in the field to begin the germination process vs. planting later where the seed may have to compete with excess cash crop residue.**

For other crops, concentrate on sunlight infiltration to the soil surface. Sunlight and moisture are the limiting factors for bare surface applications.



ANNUAL COVER CROP FORAGE		Planting Season				SEEDING INFORMATION											
		Spring	Summer	Late Sum	Fall	Carbon/Nitrogen Ratio (C:N)	Seeding Rate (mono) lbs/acre	Seeding Rate (mix) lbs/acre	Seeding Rate (for forage) lbs/acre	Seeding Depth (with drill)	Seeds/lb	Seeding Time	Bulk Density * lbs/ft <sup>3</sup>	Aerial Application Seeding Rate*	Germination Soil Temperature (Degrees Fahrenheit)	USDA Hardiness Zone	Days to Emergence
BRASSICA/MUSTARD	Daikon Radish					Tops - 9:1	3-8	1-3	5-8	1/4"	30-40,000	Aug-Sep	44	3-8	45°F	9	3-5
	Oilseed Radish					Tops - 9:1	8-12	3-8	8-12	1/4"	30-40,000	Aug-Sep	44	6-12	45°F	9	3-5
	Turnips (Top)					Tops - 9:1	2-6	2-4	3-8	1/4"	220,000	Aug-Sep	45	2-6	45°F	6-7	4-10
	Vivant Brassica					10:1 - 15:1	4-6	2-3	5-6	1/4"	165,000	July-Sep	44	5-6	45°F	7	4-6
	Forage Collards					15:1 - 25:1	5-12	1-4	10-12	1-4"-1/2"	175,000	Mar-Apr; Aug-Oct	44	8-12	40°F	5	4-10
	Rapeseed					20:1 - 22:1	4-6	2-4	6-8	1/4"-1/2"	145,000	Apr-May; Aug-Sep	45	5-8	41°F	5	4-10
	Yellow/White Mustard					20:1 - 30:1	6-15	2-5	-	1/4"-3/4"	100,000	Apr-May; Aug-Sep	46	10-15	40°F	7	5-7
LEGUMES	Crimson Clover					15:1 - 20:1	10-15	4-8	6-15	1/4"	150,000	Feb-Mar; Aug-Sep	52	6-15	42°F	7	7-10
	Berseem Clover					15:1 - 20:1	8-20	5-10	15-20	1/4"	150,000	Mar-Apr; Aug-Sep	52	6-15	40°F	8	5-8
	Balansa Clover					15:1 - 20:1	3-6	1-4	3-6	1/4"	500,000	Feb-Mar; Aug-Sep	56	3-6	40°F	5	14
	Winter Hairy Vetch					10:1 - 15:1	15-30	10-20	30-40	1"	16,000	Aug-Sep	52	NR	60°F	3-4	14
	Sunn Hemp					18:1 - 29:1	15	5-8	5-15	1/2"-1"	15,000	July-Sep	-	NR	65°F	Frost	3-7
	Austrian Winter Peas					15:1 - 20:1	30-80	10-30	40-60	1"	2,000	Aug-Sep	52	NR	41°F	6+	9
	Peas (Hay)					20:1 - 25:1	75-120	10-50	75-120	1"	3,000	Mar-Apr; Aug-Sep	50	NR	41°F	Frost	9
	Peas (Silage)					Pea Straw - 29:1	75-120	10-50	75-120	1"	3,000	Mar-Apr; Aug-Sep	-	NR	41°F	Frost	9
	Peas and Oat Mix					-	75-120	-	75-120	3/4"-1"	Varies	Mar-Apr; Aug-Sep	-	NR	41°F	Frost	5-9
	Medium Red Clover					12:1 - 16:1	8-12	6-8	8-12	1/4"	270,000	Feb-May; Aug-Oct	48	4-10	41°F	4	7-10
GRASSES	Annual Ryegrass					Vegetative - 20:1	15-30	10-15	25-35	1/4"	215,000	Mar-Apr; Aug-Oct	32	15-35	40°F	6	7
	Spring Oats (Hay)					Vegetative - 20:1	30-50	20-40	80-120	3/4"-1"	15-18,000	Mar-Apr; Aug-Sep	38	20-60	38°F	7	5-8
	Spring Oats (Silage)					Straw - 80:1	30-50	20-40	80-120	3/4"-1"	15-18,000	Mar-Apr; Aug-Sep	-	20-60	38°F	7	5-8
	Fall Rye (Hay)					Vegetative - 20:1	30-50	20-40	80-120	3/4"-1"	16-18,000	Aug-Oct	50	20-60	34°F	3	5-8
	Fall Rye (Silage)					Straw - 70:1	30-50	20-40	80-120	3/4"-1"	16-18,000	Aug-Oct	-	20-60	34°F	3	5-8
	Triticale (Fall)					Vegetative - 20:1	30-50	20-40	80-120	3/4"-1"	14-16,000	Aug-Oct	48	20-60	38°F	3	6-8
	Triticale (Spring)					Straw - 80:1	30-50	20-40	80-120	3/4"-1"	14-16,000	Mar-Apr; Aug-Sep	-	NR	38°F	3	6-8
	Barley (Fall)					Vegetative - 20:1	30-50	20-40	80-120	3/4"-1"	14-16,000	Aug-Oct	40	20-60	38°F	6	6-8
	Barley (Spring)					Straw - 80:1	30-50	20-40	80-120	3/4"-1"	14-16,000	Mar-Apr; Aug-Sep	-	NR	38°F	6	6-8
	Wheat (Hay)					Vegetative - 20:1	30-50	20-40	80-120	3/4"-1"	11-12,000	Aug-Oct	48	20-60	38°F	3	6-10
	Wheat (Silage)					Straw - 80:1	30-50	20-40	80-120	3/4"-1"	11-12,000	Aug-Oct	-	20-60	38°F	3	6-10
	Forage Sorghum					Vegetative-20:1	6-20	-	6-20	3/4"-1 1/2"	17,000	May-July	45	NR	65°F	Frost	10
	Sorghum x Sudan					Leftover Stalks-80:1	25-70	5-20	25-70	3/4"-1 1/2"	21,000	May-July	45	NR	65°F	Frost	10
	Sudangrass					-	20-45	-	20-45	1/2"-1"	43,000	May-July	40	NR	65°F	Frost	3-5
	Teff Grass					Vegetative - 20:1	8-12	-	8-12	1/4"	1,300,000	May-July	-	NR	65°F	Frost	3-5
Pearl Millet					12:1 - 20:1	20-30	5-20	20-30	1/2"-1"	60,000	May-Aug	42	NR	65°F	Frost	3-5	
German Millet					12:1 - 20:1	20-25	5-15	20-25	1"	220,000	May-Aug	-	NR	65°F	Frost	3-5	
White Proso Millet					12:1 - 20:1	20-30	5-20	20-30	1"	80,000	May-Aug	37	NR	65°F	Frost	3-5	
SOIL FIRST MIXES	SF 101 Cover Starter					-	30-35	-	40-50	1/4"-1"	-	Aug-Sep	48	30-40	45°F	-	Varies
	SF 102 Cover Starter					-	30-35	-	40-50	1/4"-1"	-	Aug-Sep	54	30-40	45°F	-	Varies
	SF 120 Extender					-	35-40	-	40-50	1/4"-1"	-	Aug-Sep	52	35-50	45°F	-	Varies
	SF 125 N-Hancer					-	35-40	-	40-50	1/4"-1"	-	July-Sep	44	NR	45°F	-	Varies
	SF 140 Multi-Purpose					-	35-40	-	40-50	1/4"-1"	-	July-Sep	50	NR	45°F	-	Varies
	SF 142 Classic					-	12-15	-	15-20	1/4"-1/2"	-	Aug-Sep	52	20-25	45°F	-	Varies
	SF 150 Field Fit					-	30-35	-	40-50	1/4"-1"	-	Aug-Sep	36	30-40	45°F	-	Varies
	SF 160 Rooting					-	15-20	-	20-25	1/4"-1/2"	-	Aug-Sep	50	20-25	45°F	-	Varies
	SF 165 Late Grazer					-	20-25	-	20-25	1/4"-1"	-	July-Sep	52	NR	60-65°F	-	Varies
	SF 167 Summer Grazer					-	25-30	-	25-30	1/4"-1"	-	July-Sep	50	NR	60-65°F	-	Varies
SF 175 AccuSpread					-	20-25	-	25-30	1/4"-1/2"	-	Aug-Sep	35	25-30	45°F	-	Varies	
SF 180 Shifter					-	20-25	-	25-30	1/4"-1/2"	-	Aug-Sep	33	25-30	45°F	-	Varies	
OTHER	Phacelia					12:1 - 18:1	8	1-2	8	1/4"	230,000	Jun-Sep	-	8-10	37°F	8	10-14
	Sunflower					Leaves 20:1, Stalks 40:1	3-5	1-2	3-5	3/4"-1"	8,000	May-Aug	28	NR	50°F	Frost	4-10
	Buckwheat					10:1 - 18:1	40-55	5-20	40-55	1/2"-1"	15,000	May-Aug	40	NR	65°F	Frost	3-5
	Sugar Beet					Tops - 19:1	2-5	1-3	2-5	1/4"	-	May-July	24	NR	-	8	-

1 - Net Energy for Lactation = Energy available after subtracting digestive and metabolic losses  
 2 - Acid Detergent Fiber = Low values mean more digestible  
 3 - Neutral Detergent Fiber = Low values mean cows can eat more  
 Days to Harvest = Estimations based on average growing season to reach optimum quality  
 NA = Not applicable; NR = Not recommended

\* +/- 5%. Bulk Density averages are only a guide. Moisture, humidity and seed quality all affect bulk density.

REFERENCES: Texas Tech University, Oklahoma State University, Iowa State University, Mississippi State University, North Dakota State University, Colorado State University, University of Florida, Michigan State University, University of Wisconsin, Kansas State University