

## Mid-Atlantic Cover Cropping Case Study – Crop Rotation Diagramming Helps Plan More Continuity & Diversity

This case study shows grain crop rotations that could potentially be implemented across much of the mid-Atlantic region. It illustrates how crop rotation diagramming can facilitate advanced cover crop planning. As we move from Rotation A to D, fallow periods or gaps in the rotation (white spaces) are progressively filled and species diversity increases. Tillage practices are not shown here to help focus on crop sequencing.

Rotation A shows the benchmark condition: a simple two-year grain rotation with winter fallow periods indicated by white spaces.

A	Spring			Summer			Fall			Winter			
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
Year 1	→	Corn Grain											
Year 2							Soybeans						→

In Rotation B1, gaps in the rotation are filled with simplest cover crop choices: small grains terminated two weeks ahead of next planting.

B1	Spring			Summer			Fall			Winter			
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
Year 1	→	Corn Grain						Barley Cover Crop					
Year 2				Soybeans						Rye Cover Crop			→

Grower wants to try a triticale/forage radish/crimson clover cover mix *ahead of corn* to boost diversity, compaction alleviation (bio-drilling), nitrogen (N) fixation and nutrient cycling. However, the existing gap between soybean harvest and corn planting is too short to optimize this new cover crop, as illustrated in B2 below by red bars showing “sticking points” or overlap between cash and cover crops.

B2	Spring			Summer			Fall			Winter			
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
Year 1	→	Corn Grain						Barley Cover Crop					
Year 2				Soybeans						Triticale/Radish/Clover Cover			→

Rotation C shows how “stacking” corn after corn plus shift to earlier planting of 1<sup>st</sup> year corn and later planting of 2<sup>nd</sup> year corn opens a wider gap for cover crops ahead of half the corn acres in the system. There are pros and cons to this, but it achieves grower’s objective.

C	Spring			Summer			Fall			Winter			
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
Year 1	→	Corn Grain						Triticale/Forage Radish/Crimson Clover Cover					
Year 2				Corn Grain						Barley Cover Crop			
Year 3				Soybeans						Rye Cover Crop			
Year 4				Soybeans						Rye Cover Crop			→

Grower wants to further diversify by trying summer covers and by enhancing soil building, bio-drilling, and N fixation ahead of *all* corn crops. Diagram D1 shows one option: wheat for grain replaces soybeans in 4<sup>th</sup> year of rotation. Now four cash grain crops are still grown every four years, but a new opening is created for two back-to-back cover crops – a summer mix and a fall-seeded mix – ahead of 1<sup>st</sup> year corn.

D1	Spring			Summer			Fall			Winter			
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
Year 1	→	Corn Grain						Triticale/Forage Radish/Crimson Clover Cover					
Year 2				Corn Grain						Barley Cover Crop			
Year 3				Soybeans						Wheat for Grain			
Year 4	Wheat for Grain			Summer Cover Crop Mix			Barley/Winter Pea Cover			→			

D2 shows how further diversifying with grazing can produce income from covers while retaining or even enhancing their soil- and yield-boosting potential. Well-managed strip grazing in August and September of Year 4 could enhance availability of nutrients contained in the summer cover crop biomass. This would enhance uptake of those nutrients by the fall cover, which will in turn be terminated early enough in the spring so that many of those same nutrients should be available to the subsequent corn. Note that we switched from barley to rye cover in Year 2 for more winter grazing and regrowth potential. For many farmers, putting cattle on cropland in this way would involve many challenges, starting with putting up fences and waterers. Remember that this and any new strategy can be tried on a small acreage to start!

D2	Spring			Summer			Fall			Winter			
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
Year 1	→	Corn grain						Triticale/Forage Radish/Crimson Clover Cover					
Year 2				Corn Grain						Rye Cover Crop - GRAZED			
Year 3				Soybeans						Wheat for Grain			
Year 4	Wheat for grain			Summer Cover Mix - GRAZED			Barley/Winter Pea Cover Crop			→			

Shifting to no-fallow crop rotations as shown above typical demands more intensive management from the grower, including new strategies such as “planting green” (termination of the living cover just before, or even after, the next crop is seeded into it). Note, however, that none of the above rotations require over-seeding of cover crops – i.e., broadcasting cover crop seed over the top of cash crops that are still standing in the field. Over-seeding can work well in some cases, but it is not as reliable as traditional planting methods that place seed into the soil.

Source: NRCS