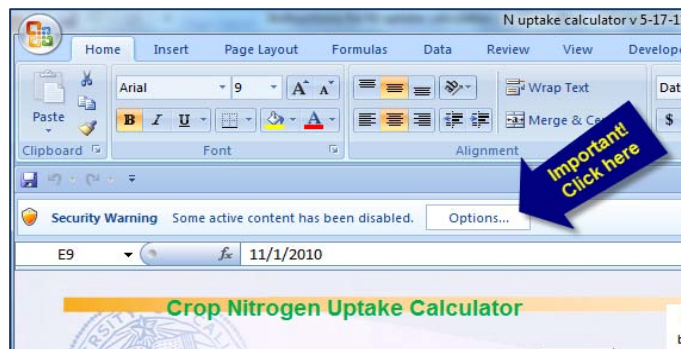


Crop Nitrogen Uptake Calculator Instructions

1. Enable Macros

When the file first opens, be sure and enable the macros by clicking the "options" button. If you forget, you will need to close the file and then re-open it.

After you click the "options" button, you will be given the option to enable or disable macros. Enable the macros and press okay. If you downloaded the program directly from the manure.ucdavis.edu, the file will not harm your computer.



2. Fill in planting and harvest dates for each crop.

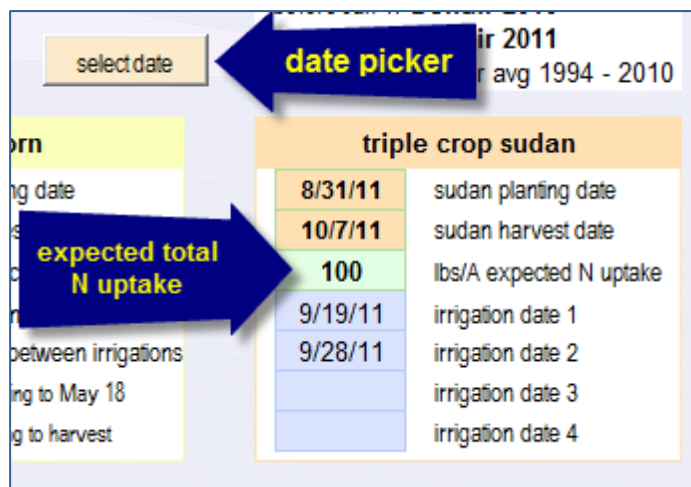
If dates are in the wrong order or are missing, the calculator will display errors instead of uptake numbers. Make sure that the next planting date doesn't precede the prior crop harvest date and also check that the years are correct.

3. Enter the amount of nitrogen uptake expected in pounds per acre.

Tons per acre of silage @ 70% moisture x % protein x .96 = lbs of nitrogen per acre

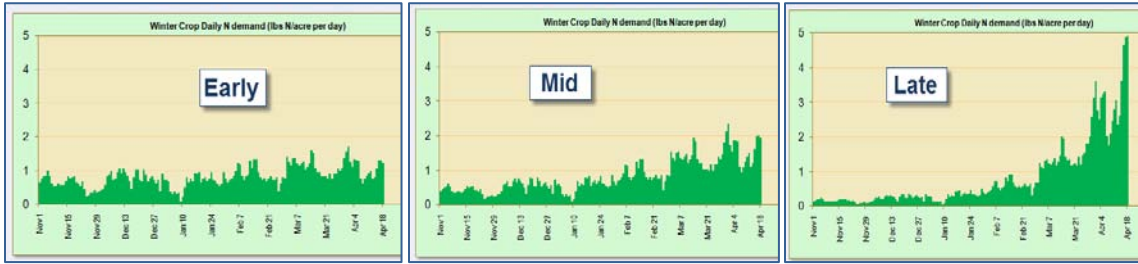
Tons of hay @ 10% moisture x % protein x 2.88 = lbs of nitrogen per acre

For winter forage and triplecrop sudan grass, enter the expected irrigation dates in the spaces provided.



For corn, enter the date of the first crop irrigation and the average number of days between irrigations.

- Select a winter forage growth pattern type, based on when the peak uptake occurs. Use the sample charts below to pick the growth pattern most similar to the type of cereal forage you have. These charts are in pounds of nitrogen per day taken up by a crop planted November 1 and cut April 18.



- Press the “weather data” button and choose the weather data to use from the list. The weather data itself is stored in the “minmax” tab. Update or add new temperature data from that page. When you have selected the desired weather years, press “okay”.

temperature data sources
before Jan 1: **Denair 2010**
after Jan 1: **Denair 2011**
backup: Denair avg 1994 - 2010

weather data ➔ **click**

Select Temperature Data Source

Primary temperature source for dates prior to January 1:
Denair 2010
Denair avg 1994 - 2010
Denair 2009
Denair 2010
Denair 2011

Primary temperature source for dates on or after January 1:
Denair 2011
Denair avg 1994 - 2010
Denair 2009
Denair 2010
Denair 2011

Backup temperature source:
Denair avg 1994 - 2010
Denair avg 1994 - 2010
Denair 2009
Denair 2010
Denair 2011

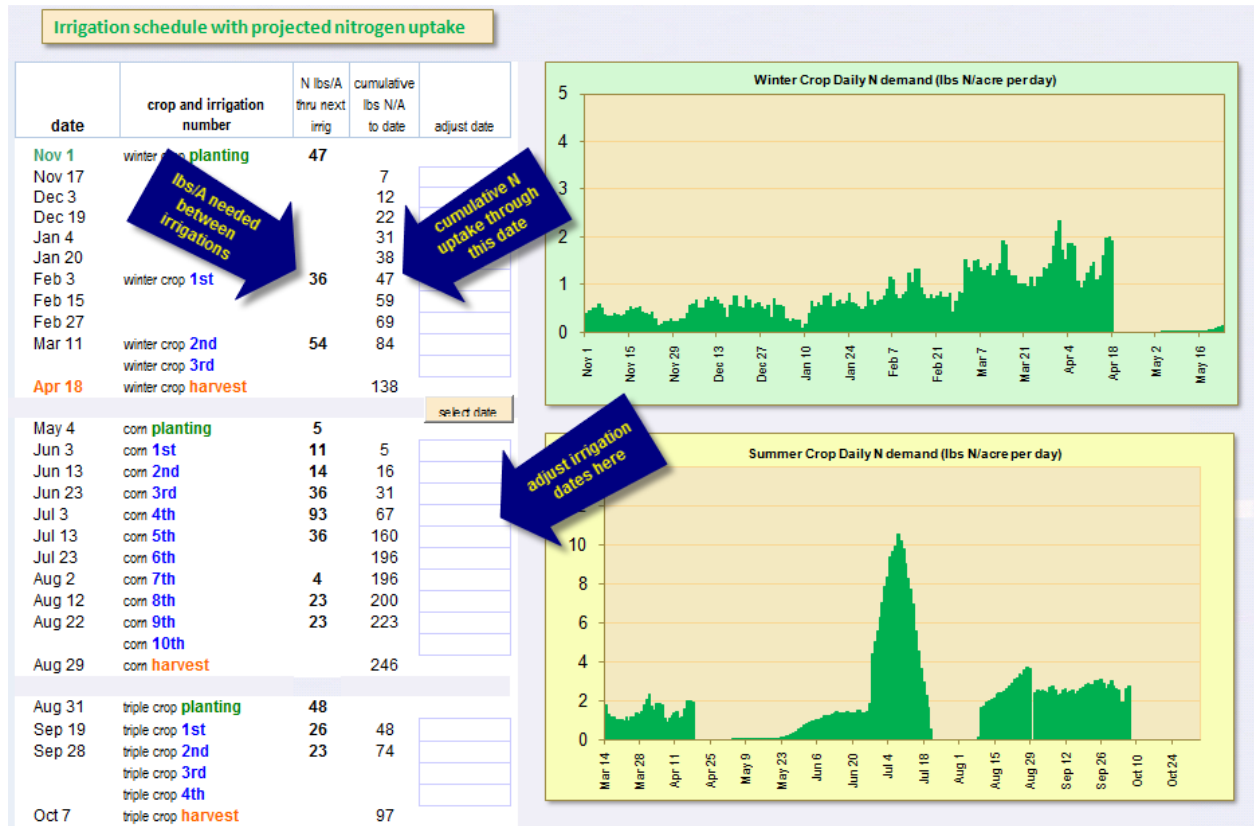
Temperature Source Min Max Cutoff

Primary temperature source 1
Select the year to use for the winter crop from planting to December 31

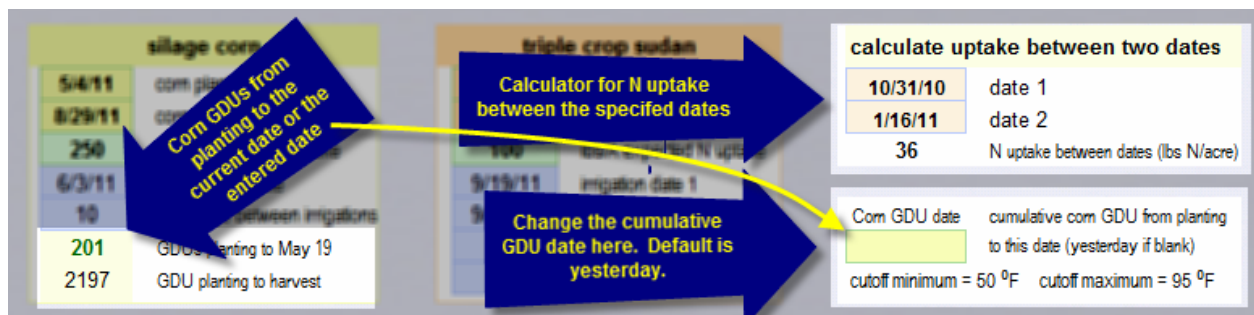
Primary temperature source 2
Select the year to use for the winter crop after Jan 1 and for the summer crop(s)

Backup temperature source 2
Backup data will be used when the primary data is missing or for forecasting dates in the future. Choose a year similar to the current year or use long term averages.

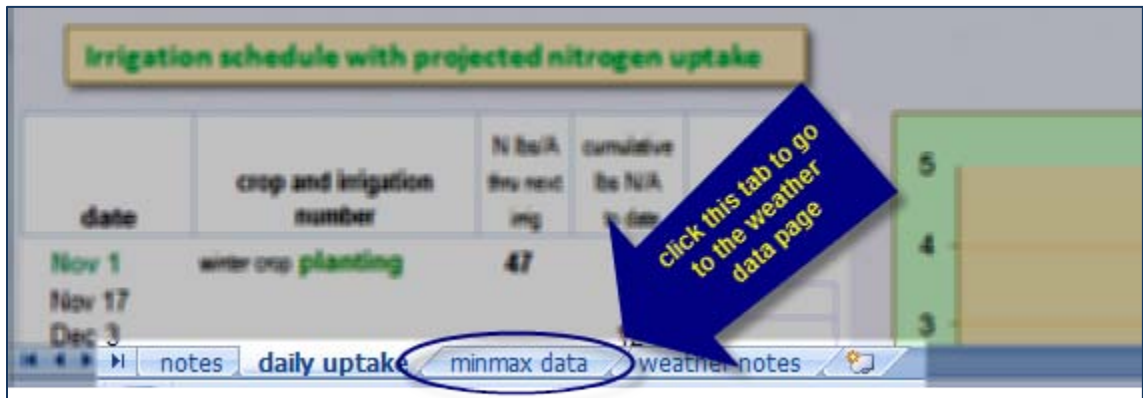
6. Scroll down to see the nitrogen uptake by irrigation interval or by cumulative to date. The winter crop has extra dates so that crop progress can be monitored during the longer periods where there are no irrigations. The calculated irrigation dates can be adjusted by entering a different date in the “adjust date” column of the projected nitrogen uptake table.



7. View the corn GDUs to date or to harvest. If desired, choose a new harvest date that will match the GDUs of the corn variety you planted. The default cutoff maximum for corn has been set to 95 °F instead of 86 °F which is used in the Midwest corn growing regions. It is felt that under well-irrigated conditions, corn is able to continue to grow at higher temperatures. This cutoff can be adjusted by pressing the “weather data” button, and choosing the “Min Max Cutoff” tab on the popup menu. Please tell us how well your custom or default minimum or maximum cutoff temperatures match your observed crop progress.



8. The temperature data does NOT automatically update. You will need to enter daily minimum and maximum temperatures if you want to have information for this year. Select the “min max data” tab and scroll to the desired year.



Daily Weather Data												
Year: 2011												
Year	Temp	Humidity	Air Min	Temperature	Temp	Precipitation	Air Max	Air Min	Soil Max	Soil Min	Temperature	Precipita
Jan 1	49		60	43	52	50	0.47	51	42	49	48	
Jan 2	49	0.01	53	38	51	50	0.67	48	45	50	49	
Jan 3	47		50	45	52	51		54	36	51	50	
Jan 4	46		57	37	52	51	0.02	48	30	50	49	
Jan 5	46		47	39	51	51	0.01	43	32	49	48	
Jan 6	47		47	39	51	50		40	38	49	48	

The nitrogen uptake model does not use precipitation or soil temperature data. However, the nitrogen mineralization calculator does require this information.

IMPORTANT: Use these models to manage crop nitrogen at your own risk! Biological systems are far too complex for any model to be 100% accurate; never rely solely on a model when making management decisions. Please share your observations of how well the models seem to be predicting - or not predicting - your crop situation. We are relying on real-life feedback to continually refine and adjust these tools.

Crop Organic Nitrogen Mineralization Calculator Instructions

1. The same weather data years are used in the mineralization calculator as are used in nitrogen uptake calculator, however instead of using the minimum and maximum air temperature, the N release model uses soil temperature. Make sure that the location and year you are using actually has soil temperature data available. Since the IPM weather stations record both minimum and maximum soil temperature, the program averages these to get one value per day.
2. Select the mineralization tab at the bottom of the page.



3. Set up the applications

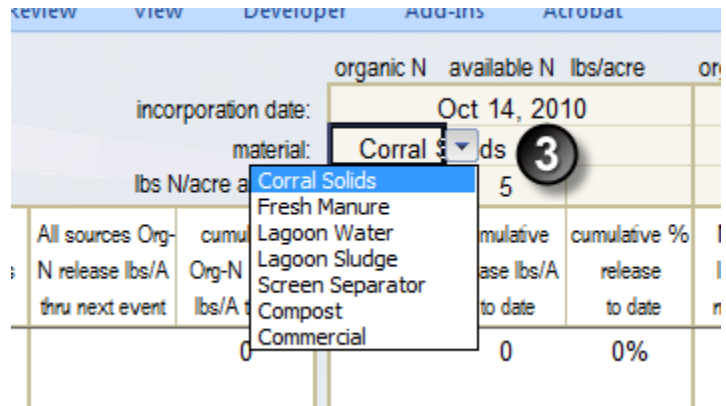
The projected irrigation dates have been carried forward from the “daily uptake” page.

Add additional application dates in the outlined boxes on the left. ①

Add application dates for each material in the top row ②. If these dates do not match a date in the left column, available nitrogen, if any, will not be displayed in the summary timeline.

Organic Nitrogen Mineralization Calculator										organic N available N lbs/acre			organic N available N lbs/acre			organic
select date		Date picker		incorporation date:		Oct 14, 2010 ②			Feb 3, 2011 ②							
update data				material:		Corral Solids			Lagoon Water			Lag				
				lbs N/acre applied:		200 5			60 100			30				
date	crop and irrigation number	cumulative uptake lbs/A to date	N uptake lbs/A thru next event	Avail N all sources through next event	Avail N applied this date	All sources Org-N release lbs/A thru next event	cumulative Org-N release lbs/A to date	N release lbs/A thru next event	cumulative release lbs/A to date	% release to date	N release lbs/A thru next event	cumulative release lbs/A to date	% release to date	N release lbs/A thru next event		
Oct 14, 2010	① preplant 1 winter crop preirrig			5	5		0		0	0%						
Nov 1, 2010	winter crop planting	6	47	31		31	5	31	5	3%	0					
Nov 17, 2010		11					10		10	5%						
Dec 3, 2010		19					15		15	8%						
Dec 19, 2010		28					19		19	10%						
Jan 4, 2011		37					24		24	12%						
Jan 20, 2011		47					28		28	14%						
Feb 3, 2011	winter crop 1st	47	39	116	100	16	31	6	31	15%	9	0	0%			
Feb 15, 2011		58					37		33	17%	4	4	6%			
Feb 27, 2011		71					42		35	18%	7	7	11%			
Mar 11, 2011	winter crop 2nd	86	53	13		13	47	4	37	19%	9	10	16%			
Apr 18, 2011	winter crop 3rd						60		41	21%	19	19	32%			
Apr 18, 2011	winter crop harvest	139		10		10	60	3	41	21%	7	19	32%			
May 1, 2011	① preplant preirrig						65		43	21%		22	37%			
May 15, 2011	com planting	6	6	11		11	70	3	44	22%	8	26	43%	0		
Jun 14, 2011	com 1st	6	14	51	45	6	81	1	47	23%	3	34	57%	3		

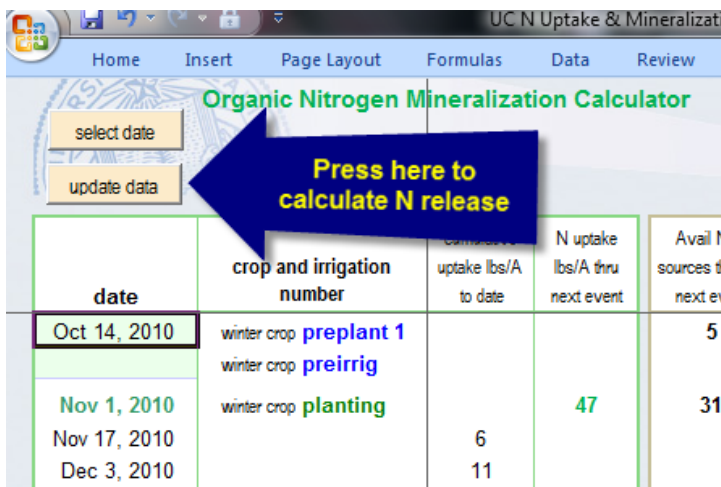
Select a material type from the drop down in first cell of the material entry blank. ③



Enter the pounds per acre of organic form nitrogen ④ and ammonia form nitrogen ⑤ associated with this application. Total N or TKN minus ammonium form nitrogen equals organic form nitrogen.
 $TKN - \text{ammonium N} = \text{Organic N}$

		organic N	available N	lbs/acre	organic N	available N	lbs/acre	organic N
incorporation date:		Oct 14, 2010			Feb 3, 2011			
material:		Corral Solids			Lagoon Water			La
lbs N/acre applied:		200	5		60	100		
sources Org-	cumulative	N release	cumulative	cumulative %	N release	cumulative	cumulative	N re
ase lbs/A	Org-N release	lbs/A thru	release lbs/A	release	lbs/A thru	release lbs/A	% release	lbs/
ext event	lbs/A to date	next event	to date	to date	next event	to date	to date	next
		0	0	0%				

4. Update the data by pressing the “update data” button on the top left corner.



The cumulative percentage of the applied organic form nitrogen that is release up to the date in the left column is displayed in columns 6. Columns 6 has the % released for the individual application. Use this column when targeting applications to decide how much of the organic N will be useful to the current crop. Columns 7 show the estimated cumulative pounds of nitrogen released up to date in the left column. 7a is the estimated pounds released for the individual application, and 7b adds together the pounds released from all the applications made this crop year. Columns 8 shows how many pounds of nitrogen will be released during the period between the current irrigation or application and the next irrigation or application. 8a is the individual amount and 8b summarizes these amounts over all applications. In column 9, the amount of ammonia form nitrogen that was added for each date is shown. It is presumed to all be immediately available. Both the applied available nitrogen and the total amount of nitrogen released from the organic form for the interval beginning with the date in the left column is totaled in column 10.

Remember these are estimates. When making management decisions, it is also critical to consider that losses of available nitrogen can be significant, especially on light soils where it has been documented that half or more of the nitrate nitrogen in the root zone can disappear in a single irrigation due to leaching or other losses. During the summer, it takes only a few days for the ammonia form nitrogen applied with the lagoon water to convert into the leachable nitrate form. When leaching or other losses are anticipated, losses can be minimized by timing applications so that large amounts of excess nitrate are not present in the soil during leaching events.

Organic Nitrogen Mineralization Calculator										organic N available N lbs/acre			organic N available N lbs/acre			organic
select date										incorporation date:		Oct 14, 2010		Feb 3, 2011		
update data										material:		Corral Solids		Lagoon Water		Lago
										lbs N/acre applied:		200		5		30
date	crop and irrigation number	cumulative uptake lbs/A to date	N uptake lbs/A thru next event	Avail N all sources through next event	Avail N applied this date	All sources Org-N release lbs/A thru next event	Org-N release lbs/A to date	N release lbs/A thru next event	cumulative release lbs/A to date	cumulative % release to date	N release lbs/A thru next event	cumulative release lbs/A to date	cumulative % release to date	N rele lbs/A t next ev		
Oct 14, 2010	winter crop preplant 1 winter crop preirrig			5	5	0	0	0	0	0%	0	0	0%			
Nov 1, 2010	winter crop planting		47	31		31	5	31	5	3%		0				
Nov 17, 2010		6					10		10	5%						
Dec 3, 2010		11					15		15	8%						
Dec 19, 2010		19					19		19	10%						
Jan 4, 2011		28					24		24	12%						
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Feb 15, 2011		58					37		33	17%		4	6%			
Feb 27, 2011		71					42		35	18%		7	11%			
Mar 11, 2011	winter crop 2nd	86	53	13		13	47	4	37	19%	9	10	16%			
Apr 18, 2011	winter crop 3rd winter crop harvest	139		10		10	60	3	41	21%	7	19	32%			
May 1, 2011	com preplant com preirrig						65		43	21%		22	37%			
May 15, 2011	com planting		6	11		11	70	3	44	22%	8	26	43%	0		
Jun 14, 2011	com 1st	6	14	51	45	6	81	1	47	23%	3	34	57%	3		
Jun 24, 2011	com 2nd	20	15	6		6	87	1	47	24%	3	36	61%	3		
Jul 4, 2011	com 3rd	35	50	6		6	94	1	48	24%	2	39	65%	3		
Jul 14, 2011	com 4th	84	108	6		6	100	1	49	25%	2	41	69%	3		
Jul 24, 2011	com 5th	193	26	5		5	106	1	50	25%	2	44	73%	2		
Aug 3, 2011	com 6th	219		4		4	111	1	51	26%	1	45	76%	2		
Aug 13, 2011	com 7th	219	11	4		4	115	1	53	26%	1	47	78%	1		

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