TECHNICAL NOTES

US DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE
AGRONOMY - 14 Albuquerque, NM
Revised: September, 2000

AMOUNT OF PLANT NUTRIENTS CONTAINED IN CROPS

Several factors need to be considered in determining the fertilization program to follow in growing farm crops. A key factor is the amount of plant nutrients removed by each crop.

There is considerable information available on plant nutrients contained in crops. However, it is seldom available for quick reference. For this reason an attempt was made to compile this information and bring it together in one place so it will be readily available for use in conservation planning and application.

It should be kept in mind that several factors might cause variations in plant nutrient content of crops. Some of these are stage of growth of the plant, soil fertility, balanced fertility, plant adaptation to the soil, how the plant is dried, competition among species for nutrients, abnormal weather, soil tilth, organic matter, and pH.

Because of variability the amounts listed are only an estimate of what might be expected under normal conditions.

All amounts of phosphorus are shown as P_2O_5 and P and potassium as K_2O and K. P_2O_5 and K_2O are the most common unit values growers and consultants use.

P x 2.29 = P_2O_5	P_2O_5 x 0.44 = P
K x 1.2 = K_2O	K_2O X 0.83 - K

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Attachment

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ESTIMATED CROP NUTRIENT REMOVAL RATES

The following table, Table 6 from the NM Nutrient Management Specification, shows the amount of crop nutrients removed by the harvested portion of the crops listed.

Table 6 Approximate Amount of Plant Nutrients Removed with Harvest (Wet Wt)

Crop	Unit	Pounds per Unit (lbs/unit)					
		N	P_2O_5	P	K_2O	K	Ref
Alfalfa, hay	ton	47.75	10.40	4.5387	43.94	36.48	4
Apples (42 lbs/box)	box	0.04	0.021	0.009	.084	0.07	1
Asparagus	ton	64	32	14	80	66	1
Barley, Straw	ton	12.13	3.20	1.3965	24.67	20.48	4
Barley. Grain	ton	39.61	16.40	7.1572	13.79	11.45	4
Beans, dry	cwt	3.80	1.20	0.5237	0.22	0.18	4
Beans, dry (vines)	ton	60.00	13.10	5.7170	39.99	33.20	4
Beans, snap	ton	17.50	11.92	5.2021	19.20	15.94	4
Beets, sugar, roots	ton	4.02	1.21	0.5281	5.76	4.78	4
Beets, sugar, tops	ton	8.05	1.80	0.7855	48.85	40.55	4
Beets, table	ton	6.80	1.21	0.5281	8.40	6.97	4
Bermudagrass	ton	9	2	1	13	11	4
Birdsfoot Trefoil	ton	14	5	2	12	10	4
Blackberries	qt	.00275	.00075	.0005	.003	.0025	3
Bluegrass, hay	ton	28.73	8.43	3.6790	26.73	22.19	4
Broccoli	lbs	.0025	0.000916	0.0004	.0054	.0045	4
Bromegrass, Hay	ton	29.00	4.03	1.7588	26.69	22.16	4
Buckwheat, Grain	bu	.75	.3	.15	.15	.1	3
Buckwheat, Straw	lbs	.0126	.0016	.0008	.01392	.0116	3
Cabbage	lbs	.0033	0.000916	0.0004	.00324	.0027	4
Cantaloupes (Fruit)	ton	4.4	1.6	0.6	8	6.6	1
Carrots, root	lbs	.0019	0.000916	0.0004	.003	.0025	4
Cauliflower (heads)	ton	5.6	2	0.93	6.67	5.6	3
Celery, tops	ton	3.40	1.72	0.7506	9.09	7.55	4
Cherries	ton	4	1	.5	5	4.25	3
Chile, Green	ton	8.0	5.50	2.4003	11.8	9.8	4
Chile, Red	lbs	.002	0.00275	0.0012	.0024	.002	4
Clover, Alsike, hay	ton	42.00	10.10	4.4078	25.00	20.75	4
Clover, Ladino, hay	ton	69.00	12.10	5.2806	48.99	40.67	4
Clover, Red, Hay	ton	42.50	10.60	4.6260	38.39	31.87	4
Clover, Sweet, Hay	ton	50.00	10.10	4.4078	24.00	19.92	4
Corn, Cobs	lbs	.004	.002	.004	.006	.004	5&6
Corn, grain	bu	0.88	0.37	0.1602	0.22	0.18	4
Corn, silage	ton	7.40	11.50	5.0188	7.17	5.95	4
Corn, stover	ton	17.83	8.02	3.5000	28.65	23.78	4
Corn, sweet	ton	17.8	11.0	4.8	13.9-	11.6	4
Cotton, all	bale	13.35	6.64	2.9	5.0	4.15	4
Cowpeas, Grain & Straw	ton	60	12 ½	5 ½	40	33	1
Cucumber	ton	4.00	3.20	1.3965	6.60	5.48	4
Fescue, tall, hay	ton	38.60	9.20	4.0150	52.89	43.91	4
Grapes	ton	5.50	4.58	2.0	5.56	8.3	4
Grass, hay	ton	28.00	8.27	3.6091	31.20	25.90	4
Hay, (all)	ton	47.20	10.30	4.4951	45.20	37.52	4
Johnson Grass	ton	21	12	5	29	24	4

Table 6 Approximate Amount of Plant Nutrients Removed with Harvest (Wet Wt)							
Crop	Unit	Pounds per Unit (lbs/unit)					
		N	P_2O_5	P	K_2O	K	Ref
Ladino clover, seed	cwt	3.0	1.51	0.66	1.4	1.16	4
Ladino clover, straw	ton	52.0	8.07	3.52	33.99	28.22	4
Lentils	ton	76.00	17.55	7.6591	19.00	15.77	4
Lespedeza Korean	ton	41	9	4	22	18	4
Lespedeza Sericea	ton	42	9	4	24	20	4
Lettuce	lbs	.0023	0.00182	0.0008	.00552	.0046	4
Muskmelons	ton	4.4	1.6	0.8	8	6.6	3
Oat, hay	ton	32.0	12.80	5.5861	22.56	18.8	4
Oats, grain	bu	0.60	0.252	0.1100	0.18	0.15	4
Oats, straw	ton	12.03	4.24	1.8504	28.99	24.07	4
Onions, Dry	cwt	0.27	0.137	0.0598	0.23	0.19	4
Oranges	box	.1083	.0383	.0167	.175	.14	1
Orchardgrass, hay	ton	19.40	21.17	9.2389	22.79	18.92	4
Pasture (grass, legumes)	ton	63.00	15.20	6.6335	51.99	43.16	4
Peaches	bu	0.06	0.021	0.009	0.108	0.09	4
Peanut	bu	1.08	0.117	0.051	.18	.15	4
Peas, seed	lbs	0.038	.00413	.0018	0.0112	0.0093	4
Peas, vine	ton	49.00	10.10	4.4078	24.00	19.92	4
Pecans, shell & nut	lbs	0.03	.003	.0013	0.24	0.02	4
Plums	bu	.075	.03	.015	.11	.09	3
Potatoes, russet	ton	6.20	8.25	3.6004	10.60	8.80	4
Potatoes, sweet	ton	6.0	2.75	1.2	10.08	8.4	4
Raspberries	qt	.00275	.00125	.0005	.003	.0025	3
Red clover, seed	cwt	3.0	1.51	0.66	1.4	1.16	4
Red clover, straw	ton	31.0	7.1	3.1	27.0	22.41	4
Redtop	ton	23	12	5	46	39	4
Reed canarygrass, hay	ton	24.10	10.11	4.4121	44.79	37.18	4
Rice	ton	12	4	1.6	28	23.2	1
Rutabagas	ton	4	2.5	1.1	10	8.3	3
Rye, grain	bu	1.15	0.334	0.1458	0.31	0.26	4
Rye, hay	ton	20.00	8.07	3.5219	25.00	20.75	4
Ryegrass, Italian	ton	12	4	2	10	8	4
Ryegrass, Perennial	ton	10	3	1	12	10	4
Sorghum, forage	ton	20.75	8.70	3.7968	33.85	28.10	4
Sorghum, grain	lbs	0.0278	0.01374	0.006	0..0084	0.007	4
Sorghum, silage	ton	7.35	2.52	1.0998	9.20	7.64	4
Soybeans	bu	3.43	0.82	0.3579	1.17	0.97	4
Spinach (Leaves)	ton	10	3	1.4	6	5	1
Strawberries	crate	.04	.025	.01	.07	.06	2
Sudan Grass	ton	28	12	5	31	26	4
Sugar Cane	ton	3.2	1.8	.8	9	7.47	1
Sweet clover, seed	cwt	3.0	1.51	0.66	1.4	1.16	4
Sweet clover, straw	ton	25.00	5.04	2.2	20.0	16.6	4
Timothy, hay	ton	22.00	7.01	3.0593	28.44	23.61	4
Tomatoes, fruit	ton	4.80	2.18	0.9514	7.60	6.31	4
Tomatoes, vine	ton	40.00	9.17	4.0019	79.48	65.98	4
Triticale, hay	ton	40.0	12.80	5.5861	36.0	30.0	4
Turnips	ton	4.5	2.0	0.9	9.0	7.5	1

Table 6 Approximate Amount of Plant Nutrients Removed with Harvest (Wet Wt)							
Crop	Unit	Pounds per Unit (lbs/unit)					
		N	P_2O_5	P	K_2O	K	Ref
Vetch, hairy, hay	ton	56.00	15.12	6.5986	45.99	38.18	4
Watermelon	lbs	.003	0.000916	0.0004	0.00036	0.003	4
Wheat, grain	bu	1.16	0.85	0.3718	0.42	0.35	4
Wheat, straw	ton	10.05	2.82	1.2307	13.44	11.16	4
Winter pea, Austrian, hay	ton	63.00	10.08	4.3991	34.99	29.05	4

Reference:

1 National Plant Food Institute

2 Kentucky Agronomy Technical Note 12 – From University of Kentucky – Home Economics & Horticulture Department figures based on net weight of 32 of 32 pounds per crate of strawberries and 30 pounds per bushels of green beans.

3 Michigan Special Bulletin 133

4 The estimates are from the average values from several sources compiled by H. Krauss in February 1977 and updated with values from the AWMFH table 6-6 (4/92).

5 Kentucky Agronomy Technical Note 12 – From Ready Reference Handbook for Kentucky

6 Kentucky Agronomy Technical Note 12 – From 21st Edition, "Feeds & Feeding" – Morrison, Tables I & IV of Appendix