AGRONOMY EXTENSION HANDBOOK

The

Production

of

Better Crops

1949

JANUARY

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DECEMBER

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AGRONOMY EXTENSION SPECIALISTS

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S. H. DOBSON (Pastures & Forage Crops)
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* Part time.

AGRONOMY

ALFALFA: Perennial—60 lbs. per bu.
Varieties: Common from Kan., Utah and Okla.
Seeding: 20 to 25 lbs. per acre. Cross drill. C. P.—Sept. 1-20; Pied.—Aug. 20-Sept. 15; Mar. 1-25; Mts. Aug. 1-30 or Apr. 1-30.
Soils: Deep, fert., fairly heavy, drained.
Fertilizer: 700 lbs. 2-12-12 & 20-35 lbs. borax at seeding. 500 lbs. 0-9-27 or 0-12-12 annually; borax and 100 lbs. muriate of potash if needed.
Lime: Very high requirement (pH 6-6.8).
Inoculation: Use twice recommended amount.
Life of seed: About 8 years; 220,000 per lb.
Harvesting: ¼ flowers open. Always before new growth reaches height of cutter bar.
Seed: Harvest second or third cutting.
Precautions: Allow 8" growth before frost.
Reference: Ext. Circular 307, 308, and 309.
Deficiency Symptoms: See color prints.
Potassium—First appears as small whitish spots near leaf margins. These may later turn brown with the leaf margins becoming yellowish and sometimes ragged and broken. Symptoms tend to occur on older leaves first but may appear over the entire plant. Boron—Produce plants with abnormal, shortened terminal internodes, reddish, bronzed, or yellow leaves near the top of the plants, and if severe terminal bud may die.
Leaf Hopper—May produce yellowing, bronzing or reddening of leaves. Yellowing often in "V" shaped areas between the veins, often confused with boron. Leaf hopper injury may occur on any part of the plant while boron symptoms appear only near the terminal ends.

ALSIKE CLOVER: Perennial—60 lbs. per bu.
Seeding: 6-10 lbs. per acre; 6-15 in C. P. C. P. —Sept. 15-Oct. 15; Pied. Mar. 15-Apr. 25; Mts. —Mar. 1-Apr. 15.
Soils: Rich, drained lowland preferred.
Fertilizer: 300 lbs. 0-12-12 or 0-14-7.
Lime: High requirement (pH 6-6.8).
Inoculation: Necessary.
Hay: Cut in full bloom.
Life of seed: About 2 years; 700,000 per lb.

ALYCE CLOVER: Annual—About 60 lbs. per bu. Makes growth same time as lespedeza but is not as satisfactory.

AUSTRIAN PEAS: Annual—60 lbs. per bu.
Seeding: 25-35 lbs. drilled; 40-50 broadcast. C. P. and Pied.—Sept. 1-30; Mts.—July 25-Sept. 15.
Soils: Sandy loams to loams.
Readily attacked by nematodes.
Fertilizer: 200 lbs. 0-12-12 or 0-14-7.
Lime: Lime desirable (pH 5-6).
Inoculation: Imperative when not in soil.

Life of seed: About 3 years; 4,800 per lb.
Diseases: Stem rot occurs frequently. Stems rot near the ground and plants die. No control; should not be planted in rotation with crops susceptible to nematodes.

BARLEY (GRAIN): Annual—48 lbs. per bu.
See grazing mixtures page 25.
Seeding: 2 bu. per acre. C. P.—Oct. 10-30; Pied.—Oct. 1-20; Mts.—Sept. 20-Oct. 10.
Soils: Only on medium to fertile soils.
Fertilizer: See "Wheat."
Top-dressing: 16-32 lb. N.; Feb. 15-Mar. 15.
Varieties: Sunrise gives high yields, is awnless and mildew resistant. Use certified seed or seed practically free of smut.
Lime: Moderate acidity (pH 5.6-6.5).
Life of Seed: About 3 yrs.
Seed Treatment: ½ oz. Ceresan (New Improved) per bu. to control covered and black loose smuts, scab, and seedling blight.
Reference: War Series Bul. No. 23.

BERMUDA GRASS: (Wire Grass) Perennial. Easily established but difficult to eradicate. Makes a good pasture when grown with lespedeza or white clover.
Varieties: Coastal (Improved) and Common.
Seeding: Root stocks usually used.
Fertilizer: See "Pastures."
Soils: Drained soils of C. P. and Pied.
Lime: Tolerant of medium acidity (pH 5-5.5).

BLUEGRASS: Perennial—14 lbs. per bu. Produces most of growth in fall and spring.
Varieties: Kentucky.
Seeding: See "Pastures" (Fall preferred).
C. P.—Sept. 15-Oct. 15 or Feb. 15-March 15.
Pied.—Sept. 1-Oct. 1 or Mar. 1-April 1.
Mts.—August 15-Sept. 15 or Mar. 15-April 15.
Soils: Fertility level must be high.
Fertilizer: See "Pastures."
Lime: High requirement.
Life of seed: About 2 years; 2,200,000 per lb.

BUCKWHEAT: Annual, 48 pounds per bu.
Seeding: ¾ to 1¼ bu. per acre.
Mountains: May 20-July 15.
Soils: Well-drained, cool, moist climate.
Fertilizer: 200-300 lbs. 3-12-6.
Lime: Tolerates medium acidity (pH 5-5.5).
Life of Seed: About 2 years.

BUR CLOVER: 50 lbs per bu.; 10 lbs. in bur. Difficult to get a stand 1st year.
Low in palatability.
Seeding: 3 to 4 bu. in bur. C. P.—Sept. 15-Oct. 15; Pied.—Sept. 1-Oct. 1; Mts.—Aug. 15-Oct. 1.
Soils: Wide range of adaptation.
Fertilizer: 300 lbs. 0-12-12 or 0-14-7.
Lime: Tolerant of acid; responds to lime.
Inoc.: Necessary unless seeded in bur.

Life of Seed: About 5 years; 209,000 per lb.

CARPET GRASS: Perennial—18-36 lbs. per bu. Not desirable where Dallis or Orchard will grow. Fertilize, disk and seed lespedeza on existing stands. White clover, Bur and Hop clovers also useful.

Soils: Moist, low fertility soils.

Fertilizer: At 2-year intervals—300 lbs. 0-14-7.

Lime: Tolerant of medium acidity (pH 5-5.5).

Seeds per pound: 1,350,000 average.

CORN: Annual—56 lbs. per bu.; 70-80 in shuck.

Varieties: Recommendations on page 49.

Spacing: Fertilizers are most efficient when average ear size is less than ½ lb.

Acre Yields	3.5 Ft. Rows
Up to 50 bu.	24" in row. See page 52.
50 to 75 bu.	21" in row for plants
75 to 100 bu.	16" in row per acre

Est. Acre Requirement of Hybrid Corn Seed

Grade*	Seed per lb.	Approx. seed per acre required for spacing shown in 3½ ft. rows			
		14 in.	16 in.	18 in.	20 in.
S. F.	1850	5.8 lb.	5.1 lb.	4.5 lb.	4.1 lb.
M. F.	1650	6.5 lb.	5.7 lb.	5.0 lb.	4.5 lb.
L. F.	1250	8.5 lb.	7.5 lb.	6.6 lb.	6.0 lb.
S. R.	1600	6.7 lb.	5.8 lb.	5.2 lb.	4.7 lb.
M. R.	1250	8.5 lb.	7.5 lb.	6.6 lb.	6.0 lb.
L. R.	1100	9.7 lb.	8.5 lb.	7.5 lb.	6.8 lb.

*Grades are (S) Small, (M) Medium, or (L) Large; (R) Round or (F) Flat kernels.

Fertilizer: Mix high rates with soil to prevent injury to germination.

Preceding Crop	Rate	Grade
Heavy fertilized crops: tobacco, cotton, truck, etc.	200-300	6-8-6 or 7-7-7
Small grain, legumes or other lightly fertilized crops	300-500	6-8-6, 4-8-8 or 6-6-12

Seeding date: C. P.—Mar. 25-June 1; Pied.—April 1-June 1; Mts.—May 1-June 1.

Seed Treatment: Semesan Jr., 1½ ozs. per bu. or Arasan at 1 oz. per bu.

Cultivation: Avoid late or deep cultivation but control weeds early.

Side-dressing: At 6 to 8 weeks or 2½ ft. Use the 2" to 1" rule for reasonable rates of nitrogen (2 lbs. of nitrogen for 1 bu. of corn).

8 bu. from 100 lbs. 16% nitrate of soda.
10 bu. from 100 lbs. 20% Calnitro.
16 bu. from 100 lbs. 32.5% ammonium nitrate.

Use enough to produce desired yield increase. Use 75-100 lbs. muriate of potash if needed.

Lime: Apply to legumes in rotation (pH 5.5).

Life of Seed: About 2 years.

Reference: Ext. Circ. 296 and Ext. Folder 65.

Deficiency Symptoms: See color prints.

Nitrogen—Plant stunted and spindly with pale green color in early stages. Bottom leaves begin to turn yellow at tips. Yellowing proceeds down the center or midrib of the leaf, leaving outside portion green. Yellowed portion dries up or "fires," and finally the whole leaf dies. In more severe cases, the "firing" of leaves progresses up the plant.

Phosphorus—Young plants appear stunted and often have purplish color. Older plants usually do not show purplish leaves, but appear spindly with the stalk small and round. Tasseling, silking and maturity delayed.

Potash—Older or bottom leaves scorch or burn along the margins and tips. Usually yellow streaking occurs near the scorched margins, while the center of the leaves remains green. In severe cases this process progresses upward, the plant is dwarfed because of short internodes, and the grain is usually chaffy. Lodging often occurs due to lack of proper stalk and root development in later stages of growth.

Moisture—Leaves wilt and roll or twist without turning yellow. Rolling most common at midday; the leaves usually unroll at night unless the drought is severe. Leaves or parts of leaves may die on any part of the plant and is not confined to the older leaves as in the case of nitrogen and potash deficiency symptoms.

Estimating Yields: Multiply the weight of shucked corn on 50 ft. by the factor:

Row Width	Early or wet	Normal or dry	Row width	Early or wet	Normal or dry
30″	4.43	4.84	42″	3.16	3.45
31″	4.28	4.69	43″	3.09	3.38
32″	4.15	4.54	44″	3.02	3.30
33″	4.01	4.39	45″	2.95	3.22
34″	3.90	4.27	46″	2.89	3.16
35″	3.79	4.15	47″	2.83	3.09
36″	3.68	4.02	48″	2.76	3.02
37″	3.58	3.92	49″	2.70	2.96
38″	3.48	3.82	50″	2.65	2.90
39″	3.40	3.72	51″	2.60	2.85
40″	3.32	3.64	52″	2.55	2.79
41″	3.24	3.55			

Example: 25 lbs. shucked corn on 50 ft. of 3½ ft. rows in a wet season; 25x3.16 or 79 bu.

Estimating Corn in Crib: Multiply length x width x height equals cubic feet. Divide by 3.5 for corn with husks; 2.5 for husked ear corn; 3 to 3.25 for early harvested and husked hybrid ear corn. This gives bushels of corn.

CORN (Silage): See Corn above.

Varieties: A recommended hybrid. Plant 1/5 thicker for maximum tonnage. Three hybrids

averaged 18% more than Pamunkey at Willard. Smaller stalks permit easier handling. Hunberrier, Eureka or Pamunkey if a late variety is desired.

CORN (Pop): 60 pounds per bushel.
Varieties: South American; Hybrids, K_4 or Perdue 32 best quality and dries rapidly. Perdue 31 high yield, good expansion and quality. Perdue 38 highest yielding, dries slowly, quality not best.
Seeding: About 1½ times as thick as field corn. Lower C. P.—April 10-June 10; Upper C. P.—April 20-June 1; Pied.—April 20-June 1; Mts.—May 1-June 1.
Soils, Fertilizer, Lime: See CORN.
Harvesting: Leave in fields until stalks and fodder are dry. Pick following 2 to 3 days warm dry weather. Should be stored 7 to 9 months before popping.
Crossing with Field Corn: Can be planted in same field when the same color; 300 yds. away to prevent color mixing.
Popping: 13.5% moisture for standard electric popper; slightly higher for wire popper. Hot enough to start popping in 60 to 90 seconds.

COTTON: Annual in N. C.—30 lbs. per bu.
Varieties: Coker 100 wilt resistant is the adopted variety in all one-variety programs.
Seeding: 25 to 30 lbs. per acre. Use mechanically treated seed germinating 80% or better.
Soils: Drained, fairly heavy sandy loams.
Fertilizer: Side place fertilizer or mix with soil to decrease fertilizer injury.

	Coastal Plain	Piedmont
Average	500 5-10- 5	600 4-12- 4
Low potash	500 3- 9-12	600 2-12-12
Fertile soils	500 3- 9- 9	600 3-12- 6

Side-dressing: 16 lbs. N; 75 lbs. muriate of potash in rotation with peanuts, legumes for hay, etc.; or 160 lbs. 10-0-30.
Lime: Dolomitic for legumes in rotation.
Life of Seed: About 5 years; 4,000 per lb.
Seed Treatment: For 1 bu. of fuzzy seed, 1½ oz. per bu. of Dow-9B, New Improved Ceresan or Ceresan M; for one bu. of delinted seed use 1 oz. Dow-9B, ¾ oz. new improved Ceresan or 1 oz. Ceresan M.
Reference: Ext. Circular 258, 312.

SEED STOCK RENEWAL PLAN (5000 ACRES)
1. Select 1% of growers to plant foundation seed direct from the breeder each year. (50 bu. produces 500 bu. for increase growers.)
2. At least 10% plant their entire crop with one year old seed from above. (500 bu. produces 5,000 bu. seed for entire community).

3. The seed produced by No. 2 above should plant the 4,450 remaining acres in community. **No seed should be planted that are over two years from the breeder.**

COWPEAS: Annual—60 lbs. per bu.
Varieties: C. P. & Pied.—Brabham, Iron, Clay, Whippoorwill, Black, etc. Mts.—Whippoorwill, Clay, Black, etc.
Seeding: ½ bu. in rows; 1 bu. broadcast.
C. P. & Pied.—May 1-July 15. Mts.—May 10-June 15.
Seed Treatment: Semesan or Spergon, 2 ozs. per bu.
Soils: Wide range.
Fertilizer: See Soybeans.
Lime: Tolerant of medium acidity (pH 5-5.5).
Inoculation: Not necessary.
Life of Seed: About 2 years; 2,000 per lb.
Hay: Cut when first pods have matured.

CREEPING BENT GRASS: Related to Redtop. Used for lawns and golf greens.

CRIMSON CLOVER: Annual—60 lbs. per bu.
Varieties: Southern grown; Dixie, a new variety, has hard seed and reseeds.
Seeding: 20 lbs. drilled; 25 broadcast. C. P. & Pied.—Sept. 1-30; Mts.—July 25-Sept. 15.
Soils: Medium to heavy, well drained.
Fertilizer: 200 lbs. 0-12-12 or 0-14-7.
Lime: Will not tolerate excess acidity.
Inoculation: Imperative when not in soil.
Life of Seed: About 2 years; 150,000 per lb.
Hay: Not later than when flowers fade at base of most advanced heads.
Reference: War Series Bul. No. 24.

CROTALARIA: Annual—60 lbs. per bu.
Green manure crop for soil improvement.
Varieties: C. P. & Pied.: Carolina or Early Spectabilis for seed or volunteer crop; Late Spectabilis does not produce seed; Striata for greatest growth but difficult to turn under.
Seeding: Spectabilis—6 lbs. in rows, 20 lbs. bdc.; Striata—5 lbs. in row, 10 lbs. bdc. Seed must be scarified.
C. P. and Pied.—April 1-May 15.
Soils: Sandy, low fertility.
Fertilizer: 200 lbs. 0-12-12 or 0-14-7.
Lime: Tolerant of medium acidity (pH 5-5.5).
Inoculation: Not necessary.
Life of Seed: About 7 years.
Seed: Hand-picked or combined with difficulty. Separate green seed to prevent rotting.

DALLAS GRASS: Perennial—15 lbs. per bu.
A perennial bunch type; one of earliest summer grasses; fairly resistant to drought; withstands reasonably close grazing; grows well with lespedeza and white clover. May winter kill in Mountains.

Seeding: 12-15 lbs.; see "Pastures."
C. P.—Feb. and March; Pied.—March 1-31.
Soils: Heavier soils, responds to fertility.
Fertilizer: See "Pastures."
Lime: Tolerates medium acidity (pH 5-5.5).
Life of Seed: About 7 years.
Seeds per pound: 340,000 average.

FESCUE, TALL: Perennial — 24 lbs. per bu.
Promising with Ladino. Greener in midsummer and winter than orchard, also wider adapted.
Varieties: Alta and Kentucky 31.
Seeding: 25 lbs. broadcast; less in mixtures.
Seed in early fall or spring.
Soils: All except sandy types.
Fertilizer: See "Pastures".
Lime: Tolerates medium acidity (pH 5-5.5).
Life of Seed: 1 to 2 years.

HOP CLOVER: Annual—Also Low Hop.
Makes early spring growth.
Varieties: Confusion exists. Get seed from Middle Tenn. Exp. Sta., Columbia, Tennessee.
Seeding: Bdc. 2 lbs. on pasture in Sept.
Soils: Wider range than white clover.
Fertilizer: 200 lbs. 0-12-12 or 0-14-7.
Lime: Requires more than lespedeza.
Inoculation: Not necessary.

JOHNSON GRASS: Perennial—Illegal to sell seed. Not recommended because of spreading and difficulty in eradication. Utilize existing stands, but prevent spreading seed.
See "Weed Control."
Soils: Heavy, fertile soils.
Lime: Tolerates medium acidity.
Hay: Cut as heads start out of boot, but before ¼ of heads have emerged.

KUDZU: Perennial.
Planting: 500 two- or three-year-old crowns. Dig holes 18 in. square, 15 in. deep. Plant on 20-foot squares on gullied land.
Soils: Reclaiming gullies and waste land.
Fertilizer: At planting and every 2-3 years 200-500 lbs. 0-18-0; 0-14-7 for low fertility.
Lime: Tolerates medium acidity.

LADINO CLOVER: Perennial. Giant species of white clover. Produces more grazing than white clover; will not stand as close grazing.
See WHITE CLOVER.

LESPEDEZA: Annual—25-45 lbs. per bu.
Varieties: C. P.—Kobe; Pied. and Mts—Korean and Kobe.
Seeding: 20-40 lbs. C. P.—Feb. 1-March 15. Pied.—Feb. 1-April 1; Mts.—March 15-April 15.
Soils: Rich or red soils for Korean; C. P. for Kobe.
Fertilizer: 200 lbs. 0-12-12 or 0-14-7. 75 lbs. muriate of potash if needed.
Lime: Low requirement; responds to lime.

Inoculation: Not necessary.
Life of Seed: About 3 years.
Seeds per pound: Korean, 240,000; Kobe, 185,000; Common, 343,000; Sericea, 335,000.
Hay: Early bloom or when not over 15 in. tall. For best quality hay, followed by a good seed crop, cut 30 days before bloom.

LESPEDEZA, SERICEA: Bu., equals 30-34 lbs., unhulled; 60 lbs. scarified. A perennial used for erosion control, soil improvement and as a forage crop.
Seeding: 30-40 lbs. unhulled; 15-20 lbs. scarified. Bdcst. late fall or early spring unhulled; March and April when scarified.
Soils: Most. Does best on fertile loams.
Inoculatiton: Not necessary.
Fertilizer: 200 lbs. 0-12-12 or 0-14-7.
Lime: Low requirement.
Hay: Cut when 12 inches, 3-4 times per yr.

MILLET: Annual—50 lbs. per bu.
Varieties: Pearl for summer grazing; Foxtail or Japanese for hay.
Seeding: 20 lbs. drilled; 30-40 bdcst.
C. P.—May 1-July 15; Pied.—May 10-July 15; Mts.—May 20-July 1.
Seed Treatment: ½ oz. Ceresan (New Improved) per bu.
Soils: Most drained moderately heavy soils.
Fertilizer: 200 lbs. 6-8-6; 5-10-5 Pied. and Mts.
Lime: Tolerant of medium acidity (pH 5-5.5).
Top-dressing: For grazing, 16-30 lbs. nitrogen.
Life of Seed: About 4 years.
Seeds per pound: 220,000 average.

OATS (GRAIN): Annual—32 lbs. per bu.
Varieties: C. P.—Fulgrain, Victorgrain, Stanton, and Letoria. Pied. — Letoria, Fulgrain, Stanton, Lee, Victorgrain, and Lemont. Mts.—Letoria and Fulwin; Burt or White Spring for spring planting.

Variety	Maturity	Height	Cold Res.	Straw	Smut	Rust
Fulgrain	E'ly	Low	F	G	R*	Res
Fulwin	Late	Tall	Ex	F-Ex	S	Sus
Lee	Med.	Med.	Ex	G	S	Sus
Lemont	Med.	Med.	G	F-Ex	R*	Sus
Letoria	Med.	Med.	G	G	R*	Res
Stanton	Med.	Med.	G	G	R*	Res
Victor-Grain	E'ly	Low	F	Ex	R	Res

F—Fair; G—Good; Ex—Excellent; S—Susceptible; R—Resistant; R*—Resistant (to some).

Seeding: 2 bu. in fall; 3 bu. in spring.
C. P.—Oct. 10-20; Pied.—Oct. 1-25; Mts.—Sept. 20-Oct. 10 or March 15-April 15.
Soils: Loams and sandy loams.

Fertilizer and Top-Dressing: See WHEAT. Page 17.
Lime: Tolerant of medium acidity (pH 5-5.5).
Life of Seeds: About 3 years.
Seeds per pound: 12,700 average.
Hay: Cut by late milk or early dough stage.
Reference: War Series Bul. No. 23.

OATS (GRAZING): See OATS (GRAIN). See GRAZING MIXTURES, Page 46.
Varieties: C. P.—Fulgrain and Victorgrain; Pied.—Lelina, Letoria, Lee, Stanton and Victorgrain; Mts.—Letoria and Fulwin.
Seeding: 3 bu. drilled; 4-5 bu. broadcast.
Seed Treatment: ½ oz. Ceresan (New Improved) per bu.

ORCHARD GRASS: Perennial—14 lbs. per bu. Erect bunch type, growing early and late in season. Particularly valuable in early stages, if establishing a pasture.
Seeding: See PASTURE MIXTURES.
C. P.—March 1-31 and Sept. 1-30; Pied.—March 1-31 and Sept. 1-30; Mts.—March 15-April 15 and August 15-Sept. 15.
Soils: Drained, moderately heavy types.
Fertilizer: See "Pastures."
Lime: Tolerant of medium acidity (pH 5-5.5).
Life of Seed: About 2 years.
Seeds per pound: 600,000 average.
Hay: Cut when flowering begins.
Seed: Can be combined or cut and thrashed.

PASTURES (Permanent): A good pasture must contain a mixture of at least one grass and one legume. Soil fertility is the key to good pastures.
Seed Bed. Shallow, firm, well-pulverized. Plowing not necessary. Pulverize seed bed by disking in time to permit rain to settle seed beds. Break crust just before seeding.

Seeding Mixtures for Coastal Plain:

Av. Sandy Soils—10 lbs. Dallis grass
15 lbs. Kobe lespedeza

Fertile Moist Soils—10 lbs. Dallis grass
5 lbs. orchard grass
15 lbs. Kobe lespedeza
1 lb. white clover; or
12 lbs. orchard grass, and
2 to 3 lbs. Ladino clover

Poorly Drained Soils—10 lbs. tall fescue
2 lbs. Ladino clover

Sandy Well-drained Soils—Bermuda rootstock
15 lbs. Kobe lespedeza

Seeding Mixtures for Piedmont and Mountains:

Good to Medium Soils—10 lbs. orchard grass
2 lbs. Ladino clover, or
10 lbs. orchard grass
15 lbs. lespedeza, and
1 to 2 lbs. white clover

Medium to Poor Soils—8 lbs. orchard grass
4 lbs. redtop grass
15 lbs. lespedeza
Poorly Drained Soils—10 lbs. tall fescue
2 lbs. Ladino clover
(Korean in the mountains)

Seeding Dates: Dallis grass and lespedeza seeded in Feb. or March. (Dallis seed must be covered). For all others: C. P.—Sept. 15; Pied. —Sept. 1, and Mt.—Aug. 15.

Fertilizer at Seeding: 650 lbs. 0-12-12; 600 lbs. 0-14-7; or 450 lbs. 18% phosphate and 100-160 lbs. muriate of potash. (This supplies about 80 lbs. P_2O_5 and 50-80 lbs. K_2O.) 800 lbs. 2-12-12 for Ladino.

Fertilizer for Maintenance: 400-500 lbs. 0-12-12 or 0-14-7; (0-12-12 or 0-10-20 for Ladino pastures.)

Lime: Soil test recommended. Usually 1-1½ tons unless recently limed. Should be spread uniformly and worked into soil 6 months before seeding.

Management: Rotational grazing recommended on Ladino clover pastures; supplementary grazing should be provided for both summer and winter to avoid over-grazing of permanent pastures. Control weeds by mowing about twice a year before seeds form. Scatter droppings.

Reference: Ext. Circular 286, 294, 301, 308, 309 and 310.

PASTURES (Supplementary): Good supplementary pastures should be provided to keep the milk flow up in the winter and during dry summer months. This helps to prevent over-grazing permanent pastures.

Winter: Excellent grazing is provided by a mixture of 15 lbs. Italian ryegrass, 15 lbs. crimson clover, and 1 bu. each of rye, oats, and barley per acre. Sow on good land the last of August and fertilize with 400 lbs. of 6-8-6 or any complete fertilizer, high in nitrogen. Top-dress with 100 to 200 lbs. nitrate of soda or its equivalent, in fall when growth starts and again in February.

Summer: Soybeans, Sudan grass, kudzu, and lespedeza all provide good summer grazing. See individual crops for recommendations. Also, see approximate grazing periods on page 46 for all grazing crops.

Reference: Extension Circular No. 286.

PEANUTS: Va. 22 lbs. per bu.; Spanish 30.

Varieties: C. P.—Virginia, Spanish and Improved White Spanish; Pied. & Mts.—Valencia.

Seeding: 45 lbs. Virginia (shelled); 35 lbs. Spanish and Valencia (shelled).

Seed Treatment: 1 oz. Arasan to 50 lbs. seed (1 level tablespoon per peck shelled seed).

Soils: Drained sandy loams.
Lime: Broadcast dolomitic lime when needed; if this is not done, add 400 lbs. landplaster on foliage of Virginia type.
Fertilizer: Virginia—Fertilize other crops in rotation; 50-75 lbs. muriate of potash.
Inoculation: Advisable as cost is low.
Life of Seed: About 1 year.
Seeds per pound: About 195 Va. type; 365 Spanish.
Dusting for Leafspot: Use 15-20 lbs. copper-sulfur dust or 325-mesh sulfur per acre each application. First dusting July 1-10; follow with 2 to 3 applications at 14-day intervals. Start dusting Spanish peanuts 10 days earlier.
Reference: War Series Bul. No. 17; Expt. Sta. Bul. No. 356.

RAPE: Annual. Use as pasture for hogs.
Seeding: 3 lbs. in rows; 8 lbs. bdcst.; less in mixtures. Feb. 1-March 31 or Aug. 1-Sept. 30.
Soils: Any good corn land.
Fertilizer: 300 lbs. 4-10-6, 3-12-6, or 4-12-4.
Lime: Tolerant of moderate acidity (pH 5.5-6).
Inoculation: Not necessary.
Life of Seed: About 6 years.

RED CLOVER: Biennial—60 lbs. per bu.
Varieties: N. C., Va., Tenn., Ind. and Ohio. Mammoth, sometimes called Sapling, Big English and Bull, matures 2 weeks earlier, is larger and coarser. Only one crop each season. Cumberland for Anthracnose resistance.
Seeding: 8 to 12 pounds per acre.
C. P.—Sept. 15-Oct. 15; Pied.—Mar. 1-April 15; Mts.—March 5-April 15 or August 1-31.
Soils: Limed, fertile, drained soils.
Fertilizer: C. P.—250 lbs. 0-12-12.
Pied. & Mts.—400 lbs. 0-18-0 or 250 lbs. 0-14-7.
Lime: High requirement.
Inoculation: Necessary unless present.
Hay: From half bloom to full bloom.

REDTOP (Herds Grass): Bu. equals 14 lbs.; 30-38 cleaned.
A perennial, tolerant of drought. Makes most of growth before midsummer. Relatively low yields in relation to orchard or bluegrass.
Pied.—Valuable to control weeds and diseases in tobacco rotation.
Seeding: 10-15 lbs.; also pasture mixtures.
C. P. and Pied.—Sept. and March; Mts.—Aug. 15-Sept. 15 or March.
Soils: Most soils. Tolerates low fertility.
Fertilizer: See "Pastures."
Lime: Tolerant of med. acidity (pH 5-5.5).
Life of Seed: About 6 years.
Seeds per pound: 5,000,000 average.

RHODE ISLAND BENT GRASS: Related to Redtop. Not a forage grass.

RYE: Annual—56 lbs. per bu.
See "Grazing Mixtures."
Varieties: Abruzzi.
Seeding: ¾ to 1¼ bu. grain; 2 grazing.

	Grain	Grazing
C. P.	Oct. 15-Nov. 15	Sept. 1-15
Pied. and Mts.	Oct. 20-Nov. 15	Aug. 20-31

Seed Treatment: ½ oz. Ceresan (New improved) per bu.
Soils: All drained soils.
Fertilizer: See WHEAT.
Lime: Tolerant of medium acidity (pH 5-5.5).
Life of Seed: About 2 years.
Seeds per pound: 180,000.

RYEGRASS: Annual and Perennial. 24 lbs. per bu. Used for grazing, winter cover and lawns.
Varieties: Italian. Perennial not recommended. Domestic is usually a mixture.
Seeding: 40 lbs.; 20 lbs. preceding tobacco; 15 lbs. each when sown with Crimson Clover; 1 lb. per 1,000 sq. ft. on lawns.
C. P.—Sept. 1-30; Mts.—July 10-Sept. 1.
Soils: Grows on most soil types.
Fertilizer: 400 lbs. 6-8-6 for grazing.
Top-dressing: See WHEAT.
Lime: Tolerates medium acidity (pH 5-5.5).
Life of Seed: About 2 years.
Reference: War Series Bul. No. 22.

SORGHUM: Annual (Grain). 56 lbs. per bu.
Variety: C. P. and Pied.—Wheatland, Plainsman and Martin Combine Milo. Bonita has some chinch bug resistance. Hegari give high yields but grows 5 to 6 ft. tall.
Seeding: 4 to 5 in. apart in 2 ft. rows or 2 to 3 in. in 3½ ft. rows equals 48,000 plants. Less plants on lower fertility levels.
C. P. and Pied. June 15-30 preferred. Satisfactory to July 15.
Fertilizer: Coastal Plain—350 lbs. 4-8-8; Piedmont—350 lbs. 4-12-8.
Side-dressing: 50-60 lbs. N. Reduce this amount if legume crop is turned.
Soils and Fertilizer: About same as corn.
Lime: Tolerant of medium acidity (pH-5.5).
Harvesting: Do not combine until all heads are dead ripe or after frost. Watch for heating in bin.
Insects: Chinch bug, webworm, corn earworm and corn weevil.

SORGHUM (Syrup): Annual. 56 lbs. per bu.
Varieties: C. P.—Honey, Sugar Drip, Orange, Texas Seeded Ribbon. Pied.—Honey, Sugar Drip, Orange. Mts.—Red Amber, Sugar Drip, Orange.
Seeding: 5-6 lbs. per acre in rows.
C. P.—May 1-June 15; Pied.—May 10-June 15; Mts.—May 15-June 15.

Seed Treatment: ½ oz. Ceresan (New Improved) or 1 oz. Spergon per bu.
Soils: Fertile, drained, suitable for corn.
Lime: Tolerates medium acidity (pH 5-5.5).
Fertilizer: C. P.—350 lbs. 4-8-8; Pied. and Mts.—350 lbs. 4-12-8.
Life of Seed: About 3 years.

SOYBEANS: Annual—60 lbs. per bu. See page—.
Varieties: Ogden and Roanoke for C. P. and Pied. These varieties are for seed, grazing or hay and for both full season or following small grain, potatoes or similar crops.

Comparison of Soybean Varieties

Variety	Maturity	Seed Holding	Seed Coat Color	Av. Oil %	Seed per Acre
Ogden	10/10	F**	Green	20.5	60
Roanoke	10/25	Ex	Yel.	21.5	60
Woods Yellow	10/30	F	Yel.	19.0	90
Haberlandt	10/5	P	Yel.	20.5	75
Tokio	10/25	P	Green	19.0	85
Arksoy	10/5	G	Yel.	19.5	55
Rose Non-pop	10/10	G	Yel.	19.5	60
Volstate	10/25	Ex	Yel.	21.0	60
C. N. S.	10/28	G	Yel.	17.5	50
Clemson	10/25	V. P.	Yel.	17.0	50
Laredo	10/10	F.	Black	15.0	20
Otootan	11/5	F.	Black	16.0	30

* Approx. lbs. 12 seed per ft. in 3 ft. rows.
**Ex=Excellant; G=Good; F=Fair; P=Poor

Seeding: 10-12 seed per foot of row (45-60 lbs. per acre). Good stands aid in controlling weeds. Row plantings with cultivation usually gives most satisfactory yields of seed or forage. However, if broadcast use 2 bu. per acre.
Seed Treatment: Arasan, 2 ozs. per bu.
Fertilizer: 400 lbs. 0-12-20 or its equivalent at planting. Place in bands 2½ in. to each side and 1 in. below the seed or thoroughly mix with soil to prevent injury to germination. Following Irish potatoes or other heavily fertilized truck crops, no fertilizer needed.
Lime: Use dolomitic (magnesium) lime. Have the soil tested. (pH 5.5-6.)
Life of Seed: One year.
Deficiency Symptoms: Potassium — Yellowing starts on edges of leaf and proceeds to the center of the leaf. The affected areas die and turn brown in color. Usually apparent first on upper leaves. **Manganese**—Entire leaf, with the exception of the veins, turns light green and then light yellow. The veins remain green and stand out very clearly.
Magnesium—Yellowing or bronzing of leaves in August. Yellowing most marked between the

veins but the veins do not stand out as with manganese deficiency. The base of the leaf tends to remain green in the early stages.
Hay: When beans near full development and lower leaves yellowing. (Gain in seeds offsets loss of leaves.)

SUB CLOVER: A winter annual for less productive soils than white clover. Not recommended because of low yields.

SUDAN GRASS: Annual—32 lbs. per bu.
Use for supplementary grazing and hay.
Varieties: Tift where available; otherwise sweet Sudan.
Seeding: 10-15 lbs. in rows; 30-40 drilled.
C. P.—May 1-31; Pied.—May 10-31; Mts.—May 20-31.
Seed Treatment: 1 oz. Spergon per bu.
Soil: Most drained soils except sands.
Fertilizer: 200-400 lbs. 6-8-6; 5-10-5 Pied. and Mts.
Top-dressing: See Wheat, page———.
Lime: Tolerates medium acidity (pH 5-5.5).
Seeds per pound: 50,000.
Hay: Preferably when heading out.

SWEET CLOVER: A biennial. 60 lbs. per bu. hulled; 32 lbs. per bu. unhulled. Closely related to alfalfa and thrives with less attention.
Seeding: 12-15 lbs. hulled seed per acre.
C. P.—Sept. 15-Oct. 15, suitable to precede alfalfa to inoculate soil; Pied.—March 1-April 15; Mts.—March 15-April 15.
Soils—Heavier, drained types.
Fertilizer: 700 lbs. 2-12-12.
Lime: High requirement (pH 6-6.8).
Inoculation: Necessary if not in soil.
Hay: At beginning of bloom.

TIMOTHY (Perennial): 1,200,000 seed per lb. Easy to establish and grows rapidly from seed. Useful in mountain areas of the state as a hay crop with red clover. Leafy and palatable. Seed 8 lbs. per acre in early fall with 10 lbs. red clover for hay.
Hay: Fully headed to early bloom.

TOBACCO: (Plant Beds).
Seeding: 1 oz. (3 level tablespoonfuls) recleaned seed per 300 sq. yds. sufficient for 3-4 acres; 6 acres of burley unless damaged by blue mold.
Soils: Rich, mellow, drained sandy loams that do not bake.
Exposure: A southern slope of at least 5% is best. Do not put beds in shady places.
Windbreaks: Locate the site to take advantage of thick trees, buildings, hills or build artificial windbreak to north and northwest. Tall privet hedge is excellent.

Water Supply: Establish a convenient water supply. Do not use water on beds or in the transplanter that comes from streams or ditches which drain tobacco diseased fields.

Summer Management: Sow crotalaria on unsterilized sites or crotalaria, velvet beans, soybeans or cowpeas on sterlized soil and disc into soil in August.

Fertilizer: 1½ lbs. 4-9-3 on the more fertile soils or 2 lbs. 4-9-3 on less fertile soils—per square yard—½ to not over 1 lb. per sq. yd. where chemicals are used.

Lime: Desirable on new acid land.

Weed Control: Temporary bed site — 1 lb. Cyanamid or 1 lb. Uramon and ½ lb. Cyanamid per sq. yd. 90 days before seeding.

Weed: Permanent bed site — 1 b. Uramon and ½ lb. Cyanamid per square yard 90 days before seeding. Prepare a fine, clod-free bed and rake it smooth. Broadcast ¾ of above chemical or chemicals and mix **thoroughly** with upper 3 to 4 in topsoil. Broadcast remaining ¼ and rake lightly into the upper 1 inch topsoil. Do not get chimcals too deep. Depending on firmness of land, one of the following tools is appropriate for these operations: Light drag harrow, peanut weeder, garden rake, 4-footed cultivator. These chemicals hould have moisture. Wet down the bed after applying if soil is dry. The usual or half the normal amount of fertilizer may be applied at seeding time, depending on fertility of soil. Work fertilizer uniformly into upper 1½ inches topsoil. Plenty of water is esential at seed germinating time. These chemicals work best on light sandy soils. The beginner should use them only on a small portion of the yardage until he has learned how to make them work on his soil.

TOBACCO (Burley): Annual.

Varieties: Kentucky Nos. 16, 41A.

Planting: 8,000 to 10,000 plants per acre. Start planting the last of May.

Soils: Fertile loams, upland, colluvial terraces, and 2nd bottomland. Blue Grass sod is excellent.

Fertilizer: 800 to 1,200 lbs. per acre 3-9-6 or 3-9-9. 500 to 600 lbs. where 5 to 10 tons manure is used.

Lime: Needed only on very acid soils.

TOBACCO (Flue-Cured): Annual.

Varieties: Known origin and adapted to local conditions.

Fertile Soils — 400, Yellow Special. Med. to Light Soils—402, 401, White Stem Orinoco, Virginia Bright Leaf, Yellow Mammoth, and Gold Dollar.

Planting: 5,500 to 8,300 plants per acre.

C. P.—April 20-May 20. Pied.—May 1-June 1.
See page 31 for plants per acre.
Soils: Drained sandy loams.
Fertilizers: Based on 5,000 to 6,000 plants per acre. 800 to 1,200 lbs. 3-9-6 or 3-9-9; 2-10-6 on more fertile soils or following legumes; 2-10-6 is especially needed in the old belt. Where the number plants per acre is increased, fertilizer may be increased proportionately—especially is this true of new broad leafed varieties. Mix fertilizer with soil before bedding or use split application or band placement distributor.
Lime: Tolerant of moderate acidity. (Optimum pH 5.0 to 6.).
Ref.: N. C. Folders: No. 73, Description of Varieties and Reaction to Diseases; No. 72, Barn Fire Loss Summary; No. 70, Chemical Weed and Disease Control in Plant Beds. Ext. Circ. 314, Irrigating Tobacco Plant Beds; Ext. Circ. 316, Flue-cured Barn Construction.
Club Series: No. 11, Tobacco Manual (Flue-Cured); No. 60 (Burley).
Ext. Circ.: No. 293, Better Tobacco Plants; No. 299, Tobacco Insect Pest.
Expt. Sta. Bul.: No. 352, Heating Tobacco Barns with Stokers; No. 346, Bright Leaf Tobacco Curing.

TREFOIL: (Big Trefoil—Lotus uliginosus)
Perennial: 60 lbs. per bu., 1 million seed per pound.
Adaptation: Adapted to wet land, tolerates low lime but responds to lime, phosphate, and potash.
Use: Shows promise as a grazing plant. Starts growth earlier in spring than lespedeza but later than Ladino.
Seeding: (Same as white clover) use 2 to 3 lbs. per acre. Slow to establish 1st year. Use in mixture with a grass.
Inoculation: Necessary.
(Birdsfoot Trefoil—Lotus corniculatus).
Adapted to drier soil types, has branching top like root system. (Otherwise same general characteristics as Big Trefoil).

VELVET BEANS: Annual—60 lbs. per bushel.
Varieties: C. P.—Early Speckle, Osceola, Bunch; Pied.—Early and Speckle.
Seeding: 20-30 lbs. in rows; 1 bu. bdcst.; 10-15 lbs. interplanted with corn; C. P.—April 25-June 1; Pied.—May 31; Mts.—May 10-31.
Soils: Light and sandy, C. P. and Pied.
Fertilizer: See "Soybeans."
Inoculation: Not necessary.
Seeds per pound: 960 average.

VETCH: Annual—60 lbs. per bushel.
Varieties: Hairy; common for grazing.
Seeding: 20 lbs. drilled; 25 broadcast.

C. P. and Pied.—Sept. 1-30; Mts.—July 10-Sept. 1.
Soils: All drained soils. Most satisfactory winter legume on sandy and poor soils.
Lime: Will not tolerate excess acidity.
Life of Seed: About 3 years.
Seeds per pound: Hairy, 20,800.
Reference: War Series Bulletin No. 24.

WIRE GRASS: (See Bermuda).

WHEAT: Annual—60 lbs. per bushel.
See "Grazing Mixtures."
Varieties: C. P.—5450 and 5466, Hardired, Carala and Redhart. Pied.—5450 and 5466, Carala, Redhart and Hardired. Mts. — Fulcaster and Thorne.
Seed Treatment: ½ oz. Ceresan (New Improved) per bu. for covered smut.

Variety	Head Type	Cold Res.	Maturity	Straw	Mildew	Leaf Rust
Carala	Bd'less	Fair	E'ly	Good		
Fulcaster	Bearded	Good	M-L	Fair		
Hardired	Bd'less	Fair	Med.	Fair	R*	R
Redhart	Bd'less	F-P	E'ly	Good		
Thorne	Bd'less	Good	M-L	Good		
5450	Bd'less	Good	Med.	Ex.	R*	R
5466	Bd'less	Good	Med.	Ex.	R*	R

R—Resistant; R*—Resistant to some; L—Late.

Seeding: 1-1½ bu.; 2-3 for grazing. C. P.—Oct. 22-Nov. 10; Pied.—Oct. 10-31; Mts.—Sept. 20-Oct. 10. See Hessian Fly dates page———.
Soils: Heavy loams and clay loams.
Fertilizer: 400 lbs. at seeding.

Condition	C. P.	Pied.&Mts.
Average	4- 8- 8	3-12-6
Legumes turned	0-12-12	0-14-7
Fertile soils	not usually necessary	
For grazing	6- 8- 6	5-10-5

Top-dressing: 16-32 lbs. nitrogen.
For grain—apply Feb. 15-Mar. 15.
For grazing—16-32 lbs. N as soon as plants are up except on heavy soils which have received manure. Also 16-32 lbs. N Feb. 1-Mar. 1. Additional N top-dressing in Dec. or other periods if grazing is short or plants do not have a dark green color.
Lime: Medium to moderate acidity (pH 5-6).
Life of Seed: About 2 years.
Seeds per pound: 16,000 average.
Reference: War Series Bul. No. 23.
Hay: Cut in early dough stage.

WHITE CLOVER: Perennial—60 lbs. per bu.
Gives spring and early summer growth which results in less competition for summer grasses than lespedeza. Spreads by seeds and runners.

HOME MIXING OF FERTILIZERS

Pounds of each material required to give analyses desired

Common Materials	Analyses	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%
Nitrate of Soda	16–0–0	125	250	375	500	625	750	875	1000	1125	1250	1500	1750
Sulfate of Ammonia*	20.5–0–0	98	195	292	390	488	585	684	780	878	976	1170	1366
Ammonium Nitrate	32.5–0–0	62	123	184	246	308	369	431	492	554	615	739	861
Cotton Seed meal	6–2.5–1.5	334	667	1000	1334	1667	2000						
Superphosphate	0–18–0	112	223	334	445	556	667	778	889	1000	1120	1334	1555
Treble Superphosphate	0–44–0	46	91	137	182	228	273	319	364	410	455	546	637
Muriate of potash***	0–0–50	40	80	120	160	200	240	280	320	360	400	480	560
Muriate of Potash	0–0–60	34	67	100	134	167	200	234	267	300	334	400	467
Sulfate of Potash	0–0–48	42	84	125	167	209	250	292	334	375	417	500	584
Sulfate of Potash-Magnesia	0–0–22	91	182	273	364	455	546	637	728	819	910	1092	1274

A FEW SUGGESTED GRADES FOR HOME MIXING

	Tobacco			General Crop						Truck
	3–9–6	3–9–9	2–10–6	6–8–6	4–8–8	3–12–6	0–12–12	0–9–27	0–10–20	14–0–14	6–8–6
Cotton Seed Meal	351	351	234	351	334						300
Calnitro	98	98	66	293	195	98				1366	210
Nitrate of Soda**	125	125	84	250	125	250					375
Superphosphate	950	950	1080	839	889	1334	1334	1000	1120		850
Muriate of potash***50%	70	70	70	232	320	240	480	1080	800	560	230
Sulfate of potash	166	291	166								
Dolomitic Limestone	130	115	130	35	137	78	186			74	35
Filler	110		170						80		

*Calnitro at same rate. **Ammonium nitrate at ½ this rate. ***Manure salts can be used at 2X this rate except for tobacco.

Stands heavy grazing but is not always dependable.
Seeding: 1-2 lbs. on fertile pastures.
C. P.—Feb. 15-March 15; Sept. 15-Oct. 15.
Pied.—March 1-31; Sept. 1-30.
Mts.—March 15-April 15; August 15-Sept. 15
Soils: Moderately fertile; drained.
Fertilizer: See "Pastures."
Lime: Necessary for good growth.
Inoculation: Necessary unless present.
Life of Seed: About 2 years.
Seeds per pound: 700,000 average.

FERTILIZER MATERIALS

Ammonium Nitrate NH_4NO_3; 32.5-0-0; 58A*; ½ N as in soda, other half as in sulfate of ammonia.
ANL NH_4NO_3; 20.5-0-0; N*; See Calnitro.
Basic Slag 0-9-0 By-product of steel. Lime value about 1/3 agricultural limestone.
Borax $NA_2B_4O_7$; 11% Boron; Agricultural Borax.
Calcium Meta-Phosphate 0-63-0.
Calcium Silicate Slag—About 80% liming value. Granular (quenched) and ground forms.
Calnitro NH_4NO_3; 20.5-0-0; N*; Ammonium nitrate and lime, 9% CaO and 7% MgO.
Colloidal phosphate $Ca_3(PO_4)_2$; 20% Total P_2O_5.
Cottonseed Meal 5.7-2.5-1.5 or 6.6-2.5-1.5; 10A*.
Cyanamid $CaCN_2$, 21-0-0; 6_3B*.
Dicalcium phosphates 0-40-0; N*.
Dolomitic limestone. See page 43. Liming Materials.
Double Superphosphate $Ca(H_2PO_4)_2$; 0-44-0; N*; Superphosphate with gypsum ($CaSO_4$) removed.
Fish Scrap (Acidulated) 5.7-3.0-0; 2-8A*; Treated with sulfuric acid to prevent decay.
Fish Scrap (Dried) 9.5-6-0; 3-10A*.
Fused Rock Phosphate 30% total P_2O_5.
Garbage Tankage 2.5-1.5-1.0.
Gypsum 85% Calcium Sulfate ($CaSO_4$) Land plaster used on peanuts to supply calcium.
Kainit KCl; 0-0-20; N*; Impure Salt. Contained magnesium as originally sold.
Kieserite—See Magnesium Sulfate.
Land Plaster—See Gypsum.
Magnesium Sulfate $MgSO_4$; 33% MgO; N*. Source of soluble magnesium. Same as Epsom salts.
Manganese Sulfate $MnSO_4$. Source of soluble Manganese for overlimed soils.
Manure (.6-.3-.6) (Wet basis) 60%-80% water.
Manure, Fresh excrement as % ($N-P_2O_5-K_2O$).

Animal	Dry matter	Liquid
Cattle	.32-.21-.16	.95-.03-.95
Hens	1.0-.8-.4	
Hogs	.6-.46-.44	.3-.12-.0
Horses	.5-.3-.24	1.2-T-1.5
Sheep	.65-.46-.23	1.7-.03-2.1

Manure Salts KCl; NaCl; 0-0-20; N*; Contains sodium chloride (table salt).
Muriate of Potash KCl; 0-0-50; 0-0-60; N*.
Nitrate of Soda $NaNO_3$; 16-0-0; 29B*.
Peanut Meal (7.2-1.5-1.2).
Peanut Hull Meal (1.2-0.5-0.8) Ground hulls.
Peat (2.7-0-0) A high organic matter soil.
Phosphate Rock $Ca_3(PO_4)_2$; 33% Total P_2O_5.
Potassium Metaphosphate (0-58-35) TVA.
Potassium-Calcium Metaphosphate (0-54-35).
Processed Tankage — Inert nitrogenous materials made more available by steam under pressure; sometimes acids are also used.
Soybean Meal (7-1.2-1.5) Soybeans without oil.
Sulfate of Ammonia (20.5-2-0) $(NH_4)_2SO_4$; 110A*. Used as a top-dresser.
Sulfate of Potash K_2SO_4; 0-0-48; N*. Top-dressing where chloride is injurious to tobacco.
Sulfate of Potash-Magnesia K_2SO_4; $MgSO_4$; 0-0-22; N*, 11% available Magnesia (MgO).
Superphosphate $Ca(H_2PO_4)_2$; 0-18-0; 0-20-0; N*. Rock phosphate treated with sulfuric acid. Contains around 50% gypsum ($CaSO_4$). (See double superphosphate.)
Tankage (7-10-0) Phosphate as total P_2O_5. Dried, ground animal remains.
Tobacco Stems (1.5-0.5-5.0) Ground stems.
Uramon CO $(NH_2)_2$; 42-0-0; 75A*. Trade name for Urea.

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* Acid (A). Basic (B) or neutral (N). Residue as lbs. of limestone per 100 lbs. of material.

THE FUNCTION OF PLANT NUTRIENTS

Nitrogen

Imparts dark green color to plants.
Promotes increased leaf and stem growth.
Produces crisp improved quality of leaf crops.
Produces rapid early growth.
In excessive amounts, may delay maturity.

Phosphoric Acid

Stimulates early root formation and growth.
Gives rapid and vigorous start to plants.
Hastens maturity of crops.
Especially important in seed formation.
Increases the ratio of grain and fruit to stalk.
Winter hardiness of fall-seeded grains and hays.

Potash

Imparts increased vigor and disease resistance to plants.
Produces strong stiff stalks.
Increases plumpness of grains and seed.
Essential in the formation and transfer of starches and sugars.
Promotes early root formation and growth.

Calcium

Improves plant vigor and stiffness of straw.

Regulates uptake of other plant foods.
Neutralizes poisons produced in the plant.
Encourages grain and seed production.

Magnesium

Aids in maintaining dark green color of leaves.
Regulates uptake of other plant foods.
Acts as carrier of phosphoric acid in the plant.
Promotes the formation of oils and fats.
Plays a part in the translocation of starch.

Sulfur

Gives increased root growth.
Helps maintain dark green color.
Promotes module formation on legumes.
Stimulates seed production.
Encourages more vigorous plant growth.

FERTILIZER GRADES APPROVED FOR SALE IN NORTH CAROLINA

The 1945 Legislature revised the law to permit a minimum of 15 grades and a maximum of 25 grades. The following grades were approved for sale in 1946:

General	Crops	Tobacco Only	Tobacco Plant Beds
0–10–20	4–12– 4	2–10– 6	4–9–3
0–9– 27	4–12– 8	3– 9– 6	6–9–3
0–12–12	5–10– 5	3– 9– 9*	
0–14– 7	5–10–10	5– 5–20	
2–12–12	6– 6–12		
3– 9– 9*	6– 8– 6		
3– 9–12	7– 7– 7		
3–12– 6	10– 6– 4		
4–10– 6	10– 0–30		
	14– 0–14		

* Both tobacco and general crops.

SOIL TESTING

Information blanks and free containers are available from County Agent's Office or the Soil Testing Division, N. C. Dept. of Agriculture, Raleigh, N. C. Instructions for collecting samples are as follows:

1. Soils that are different in appearance, crop growth or past treatment should be sampled separately, if the area can be fertilized separately.

2. Avoid sampling directly in the fertilized soil, when sampling fertilized fields.

3. The topsoil sample should be taken from all over the field. If larger than 10 acres, divide into two or more fields and take samples from each 5-acre portion. Take a tablespoonful of soil at 15 or more different places from the top 5 inches of soil. Place all of these in one container and mark "Topsoil." Take the subsoil sample at a depth of 12 to 16 in. at 2 or 3 places to represent the same area as the topsoil. Put these in another container and mark "Subsoil."

DESCRIPTION OF RECOMMENDED PASTURE PLANTS

Approximate Grazing Period (Months)

J	F	M	A	M	J	J	A	S	O	N	D

Type of

4. For soils in pastures or lawns, the topsoil should be taken from the upper 2 inches.

CROSS-INOCULATION OF LEGUMES

Crops listed together are inoculated by bacteria from each other.

Alsike Crimson Clover Red Clover White Clover Low Hop Clover Rabbit Foot Clover	Alyce clover Cowpea Crotalaria Lespedeza Kudzu Partridge pea Peanuts	Garden bean
Austrian pea Canada field pea Garden pea Vetch	Alfalfa Black medic Bur clover Sweet clover	Soybeans

WEED CONTROL

(Numbers refer to methods of control below.)

Bermuda Grass*—7 and 13.
Birdweed (chickweed)—3, 12, 14C, or 14D.
Broom Sedge*—Cut in late July or early August, 5 and 3.
Bitterweed—5, 6, and 12.
Buckhorn (Plantain)—1, 12 and 3.
Bull Thistle—Cut below crown before seed set.
Burdock—15.
Canada Thistle—14A or chop, June to Sept.
Chess (cheat)—1 and 6. Separate from wheat by floating off in water; sow spring oats.
Chickweed—3, 14C or D.
Cockle—12 and 3.
Cockleburs—Sow to grain and lespedeza for several years.
Coco (See Nut Grass).*
Crabgrass—2, 3.
Curled Dock—13, 3.
Daisy—15.
Dandelion—15.
Dodder—1, 11, and 8.
Dog Fennel (May Weed)—6 and 12.
Field Sorrel—5A and 12.
Honeysuckle—15.
Johnson Grass*—8, 6, 13, and 10. Mow frequently or graze heavily.
Love Vine (Dodder)—1, 11, and 8.
May Weed (Dog Fennel)—6 and 12.
Morning Glory—1 and 3.
Mustard, Wild—15.
Nut Grass*—3, 13, followed by 9, or fall plow and plant to small grain.
Pigweed—15.
Plantain—1, 12 and 3.
Pokeweed—15.
Poison Ivy—15. Kills the leaves but may not be permanently successful.

Ragweed—15.
Ripple (Plantain)—1, 12 and 3.
Sand Spurs—3, 11, and 10.
Sheep Sorrel—5A and 3.
Sour Grass (Sheep Sorrel)—5A and 3.
Sour Weed (Sheep Sorrel)—5A and 3.
Star Weed (Chick Weed)—3, 14C or D.
Strangle Weed (Dodder)—1, 11, or 8.
Wild Mustard—6 and 12. Harrow small grain fields when growth starts in spring.
Wild Onions*—3, 13, and 5. Grow small grain, clover, lespedeza or other close-growing crops.
Winter Cress—15.
Winterweed (Chick Weed)—3, 14C or D.
Wire Grass* (Bermuda)—7 and 13.

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* Perennials (live several years); require continuous control measures until eradicated.

Methods of weed control classified as follows:

1. Clean seed—Certified seed has a minimum of weed seeds. Do not plant weed seeds.
2. Good seedbed preparations destroy many weed seeds.
3. Clean cultivation prevents many weed seed.
4. Crop rotation controls many weeds.
5. Improve fertility.
   A. Limestone helps crops to crowd out weeds.
   B. Phosphate helps crops to crowd out weeds.
6. Mowing—Mow before or at blooming time. Mow higher the first time than the second. This will permit cutting below the new branches of plants such as bitterweed.
7. Shading—Dense growing crops such as soybeans, velvet beans, crotalaria, shade out many weeds and grasses.
8. Grazing close with livestock kills underground storage weeds.
9. Hogging is helpful where underground nuts or tubers are present.
10. Smothering small patches with straw, old hay or brush.
11. Burning is sometimes necessary before seed mature.
12. Rogueing scattered weeds by hand.
13. Exposure to winter cold by shallow plowing in late summer.
14. Chemicals—Sodium Chlorate is a fire hazard.
   A. 1½ lb. of Calcium Chlorate per gallon of water sprayed on foliage.
   B. 1 lb. of Sodium Chlorate per gallon of water. Spray on the foliage before bloom stage. Apply enough (1 to 1½ gal. per sq. yd.) to thoroughly moisten the vegetation. Repeat when new growth starts. 2 to 3 treatments are usually required.

CAUTION: Sodium Chlorate on clothes or other organic material ignites easily and burns rapidly. Never allow to dry on clothing or drop

LEAFHOPPER INJURY

BORAX STARVED

POTASH STARVED

TURNING PLOW INJURY

PHOSPHORUS STARVED

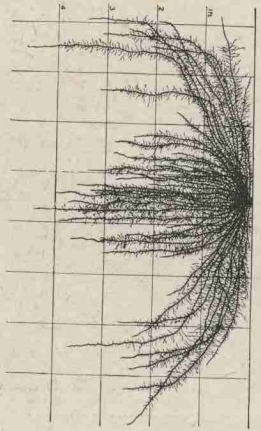
NITROGEN STARVED

ROOT GROWTH 8 WEEKS

DRY WEATHER

POTASH STARVED

ROOT GROWTH 8 WEEKS



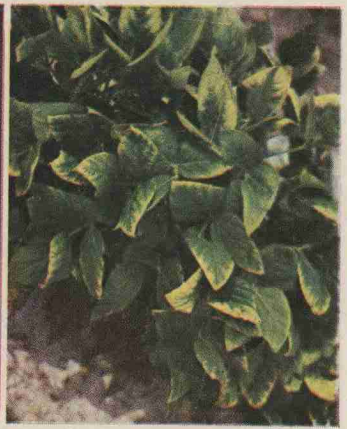
DRY WEATHER

POTASH STARVED

MANGANESE STARVED

MAGNESIUM STARVED

POTASH STARVED



any of this material around buildings. Wash person, clothing, and materials thoroughly and as soon as the job is finished.

C. Ammonium sulfate broadcast when the plants are wet.

D. Spray with a saturated solution of copperas (iron sulfate) in early spring when in lawns, peas, strawberries, grain, etc.

15. 2, 4 — Dichlorophenoxyacetic Acid Weed Killer. Sold in soluble form under different trade names. Follow the direction of the manufacturer. The leaves may be killed on poison ivy, other woody plants and perennial farm weeds without permanently killing the plants. It has not been found effective on crabgrass, quackgrass, Johnson grass, nut grass or other weedy grasses and sedges.

TEMPORARY GRAZING TO SUPPLEMENT A PERMANENT GRASS-LEGUME PASTURE

Crop	Rate	Variety	Date of Seeding C.P.	Pied.	Mts.	Approximate Grazing Period J	F	M	A	M	J	J	A	S	O	N	D
Rye	2Bu.	Abruzzi	Sept. 1–15			■	■	■	■						▪	■	
Barley	1 Bu.	Randolph or Sunrise	Sept. 1-15	Aug. 15-31	July 15 Sept. 1												
Oats	1 Bu.	Fulgrain or Fulghum	Seed Barley, Oats and Rye together			■	■	■	■	■					■	■	■
Rye	1 Bu.	Abruzzi															
Cr. Clover	15 lbs.	Southern grown	Sept. 1–	Aug. 15 –	July 15												
Ryegrass	10 lbs.	Italian	Oct. 15	Sept. 30	–Sept. 1			■	■	■							
Sudan Grass	30–35 15 lbs.	lbs. broadcast or in 2 foot rows	April 25 –June 1	May 1– July 1	May 20– July 10						■	■	■				
Lespedeza	25–40 lbs.	Korean or Kobe	Feb. 1– Mar. 15	Feb. 15– Mar. 15	Mar. 15– April 15						■	■	■	■	■		
Soy- Bdc beans Rows	2 bu. 1 bu.	Ogden, Volstate, Roanoke	April 15 –July 1	April 15 –July 1	May 15– June 15							■	■	■	■		
Kudzu	2 or 3 year old crowns		Late winter										■	■	■	■	■
Corn and Velvet Beans: Plant beans when planting corn.															■	■	■
Corn and Soybeans or Cowpeas															■	■	■

DESCRIPTION OF RECOMMENDED PASTURE PLANTS

Type of Plant	Growth Habits and Soil Adaptation	Approximate Grazing Period (Months) J	F	M	A	M	J	J	A	S	O	N	D
Bermuda Grass	Sod forming. Permits close grazing. Legumes are crowded out. Well suited for sandy, well-drained soils. Coastal variety is more productive and produces less seed.					■	■	■	■	■	■		
Bluegrass (Kent'y)	Sod forming. Permits medium grazing. Grows well with legumes. Grows on limed and fertilized soils but produces less grass than Orchard or Dallis.			■	■	■				■	■	■	
Carpet Grass	Sod forming. Permits close grazing. Crowds out legumes. Tolerates low fertility. Relatively low grazing quality.					■	■	■	■	■	■		
Dallis Grass	Semi-bunch grass. Tolerates medium butnot close grazing. Permits legumes to grow well. Suited for medium to good soils with adequate moisture.					■	■	■	■	■	■		
Orchard Grass	Bunch grass that will not permit close grazing. Grows well with legumes. Only for the more productive soils.			■	■	■	■	■	■	■	■	■	
Redtop (Grass)	Well adapted to low fertility. Relatively low yields, compared to Orchard or Dallis at higher fertility levels.			■	■	■	■	■	■				
Landino Clover	A more productive variety of White clover. It has larger leaves and leaf stalks but produces fewer blossoms. Seed are more expensive. Will not permit as close grazing. Adapted to the moist, more productive soils.			■	■	■	■	■	■	■	■	■	
Lespedeza	Kobe and Korean more productive than Common but cannot be grazed as close. Does not grow as well with grasses as White clover. Grows on most soil conditions except extremely sandy soil.						■	■	■	■			
White Clover	Spreads underground and by reseeding. Permits medium but not close grazing. Requires lime and phosphate.			■	■	■	■		■	■	■	■	

Also grow s in wet sum mers

Also grow s in wet sum mers

AREAS USED FOR RECOMMENDING HYBRID CORN

RECOMMENDED CORN HYBRIDS FOR 1948

AREA I

Full Season	Yellow— Short Season
Ffister 170	W. Va. 1163
U. S. 13	
N. C. 1032 (Silage)	
U. S. 282 (Silage)	

AREA II

Yellow— Short Season	Yellow— Full Season	White— Full Season
Wood V-35	U. S. 13	N. C. T20*
Wood V-40	Silage	Tenn. 10
Pfister 170	U. S. 282	Dixie 17
W. Va. 1163	N. C. 26	
	N. C. 27	
	N. C. 1032	

AREAS III, IV, AND V

Yellow—		White—
N. C. 26	Funk G714	N. C. T20*
N. C. 27	U. S. 282 **	Tenn. 10
N. C. 1032		Dixie 17

AREA VI

Yellow—		White—
N. C. 26	N. C. 1032	N. C. T20*
N. C. 27	Funk G714	Tenn. 10
		Dixie 17

AREA VII

Yellow—		White—
N. C. 26	N. C. 27	N. C. T20*
	Funk G714	Tenn. 10
		Dixie 17

AREA VIII

Yellow—		White—
N. C. 26	Funk G714	N. C. T20*
N. C. 27	U. S. 262	Tenn. 10
N. C. 1032	U. S. 282	Funk G515***
Funk G135***	U. S. 357	Dixie 17

AREA IX

Yellow—	White—
N. C. 27	N. C. T20*
Funk G714	Tenn. 10
	Dixie 17

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* Do not use if produced outside of your area.
** Adapted only in Area III.
***Short season.

COMMON NAMES	Neut.* Equiv.	Approximate Analyses
Agricultural or ground dolomitic limestone**	95–108	52% $CaCO_3$ 42% $MgCO_3$
Ground limestone**	85–100	80–95% $CaCO_3$
Air slacked lime		
Precipitated lime		
Lump lime	150–175	85% CaO
Builders lime		
Caustic lime		
Hydrated lime	120–135	65% CaO
Water slacked lime		
Burned oyster shells	90–110	55% CaO; 5% MgO
Baked oyster shells	80–90	85% $CaCO_3$
Marl	50–90	60% $CaCO_3$
Basic slag 8–10% P_2O_5	25–35	46% CaO; 6% MgO
Wood ashes	40–50	45% $CaCO_3$
Land Plaster	None	70–75% $CaSO_4$

*Neutralizing equivalent given as percent in comparison to $CaCO_3$ as 100.

**Fineness of grinding is important. For practical purposes a limestone ground so that 65 to 80% passes a 48 mesh screen is satisfactory providing the 100 mesh and finer materials have not been removed.

HOW TO PREPARE A COMPOST HEAP

1. Use straw, leaves and crop residues.

2. Build pen with logs, slabs, or boards; or build pile with perpendicular sides.

3. Lime, phosphate and nitrogen are needed.

A. Mix 65 lbs. ammonium sulphate, 25 lbs. superphosphate, 55 lbs. ground dolomitic limestone, and 25 lbs. muriate of potash. This is enough for 1 ton of dry material.

B. Satisfactory results can be obtained by using 1 cup 5-10-5 and 1 cup limestone for each 10 sq. ft. of surface of each layer.

4. Pack in layers 1 foot deep. Spread the fertilizer over the surface. Use a few shovels full of animal manure for rapid decomposition. Wet down the pile with water. Continue until the pile is 6 feet high. Keep the sides straight and the center lower than the edges. Do not add enough water to wash out soluble fertilizer.

One ton of dry material will produce about 3 tons of manure in 3 to 6 months. Keeping the pile wet will increase decomposition.

PLANT REMOVAL OF FERTILIZERS

Approximate—varies with Soil Fertility

CROP	Yield	Use	N Lbs.	P_2O_5 Lbs.	K_2O Lbs.
Alfalfa	3 tons	hay	143	32	134
Bermuda, grass	1 ton	grazed	10	3	15
Bur Clover	1 ton	hay	59	21	72
Cereals (av.)	1 ton	hay	23	10	30
Corn	50 bu.	grain	47	20	11
	2 tons	stover	36	16	46
Cotton	500 lbs.	lint	1.4	.5	3
	1000 lbs.	seeds	36	15	15
	1500 lbs.	plants	38	15	27
Crimson Clover	1 ton	hay	45	12	45
Grains (Av.)	100 lbs.	grain	3	.9	.9
Grasses (Av.)	1 ton	hay	22	10	30
Leaves, forest	1 ton	leaves	15	5	8
Lespedeza	2 tons	hay	77	16	41
Legumes (Av.)	1 ton	hay	47	11	39
Millet	2 tons	hay	53	14	86
Oats	50 bu.	grain	32	13	9
	1 ton	straw	12	4	30
Peanuts	1 ton	nuts	60	14	20
	1 ton	vines	39	5	41
Potatoes, I.	200 bu.	tubers	43	17	77
		tops	60	10	55
Potatoes, sweet	200 bu.	roots	30	10	50
	1 ton	vines	40	11	33
Rye	20 bu.	grain	21	8	6
	1 ton	straw	10	6	16
Sorghum	40 bu.	grain	33	20	7
	2 tons	fodder	41	13	63
Soybeans	20 bu.	seed	70	16	30
	1 ton	hay	51	14	47
Timothy	1 ton	hay	20	6	27
Tobacco, Flue-cured	1000 lbs.	leaves	26	5	25
	1000 lbs.	stalks	14	3	14
Velvet beans	1 ton	hay	52	11	53
Vetch & Oats	2 tons	hay	34	12	25
Wheat	30 bu.	grain	34	15	9
	1 ton	straw	10	3	15

SOIL CONSERVATION

Wise land use and erosion and water control are the greatest basic problems of North Carolina agriculture. The following table shows loss of topsoil and drainage requirements — all figures thousands:

Area	Land in Farms	Topsoil Lost			Productive if Drained
		25-50%	50-75%	100%†	
Mts.	2,633	640	400	55	30‡
Pied.	9,195	1,837	4,135	320	65‡
C.P.	7,016	300	60		1,800
Total	18,845	2,777	4,595	375	1,895

† Destroyed for Economical Cultivation.
‡ Bottom Land.

CERTIFIED SEED GROWERS REGULATIONS The N. C. Crop Improvement Association, State College Station, Raleigh, N. C. Application blanks are secured from the above address. Write for regulations on crops not listed.

CORN HYBRIDS: Obtain from the N. C. Foundation Seed Producers, Inc., Raleigh, N. C.
Application: File by June 1.
Isolation: At least 660 feet away from any other corn except the male parent. Border rows decrease distance required. Write Crop Improvement Association for details.

Planting Pattern: Should be systematic and one of the following:
1 male row and 3 female repeated across field.
2 male rows and 6 female across field.
1 male, 2 female, 1 male and 4 female (repeat). At least one male row should be planted on each side of field.

COTTON SEED: Cotton seed must be produced from foundation seed or certified seed. Only 5 off-type plants permitted per acre. Staple uniformity must show less than .5% mixture in field. **Application:** File by August 1.

WHEAT, OATS, RYE, AND BARLEY: Certified seed must be produced from foundation, registered or approved sources of certified seed. Do not grow certified small grain on land which grew small grain the previous year unless certified or registered seed of the same variety was grown.

Application: File by April 15.
Isolation: At least 6 feet; rye must be 660 feet from other rye.

Plants Per Acre (Thousands)

Row in.	Spacing in Row (inches)						
	10	12	14	16	18	20	24
30	20.9	17.4	14.9	13.1	11.6	10.4	8.7
32	19.7	16.3	14.0	12.3	10.9	9.8	8.2
34	18.5	15.4	13.2	11.6	10.3	9.2	7.7
36	17.5	14.5	12.5	10.9	9.7	8.7	7.3
37	16.9	14.1	12.1	10.6	9.4	8.5	7.1
38	16.5	13.7	11.8	10.3	9.2	8.3	6.9
39	16.1	13.4	11.5	10.1	9.0	8.1	6.7
40	15.7	13.1	11.2	9.9	8.7	7.9	6.5
41	15.3	12.8	10.9	9.6	8.5	7.7	6.4
42	14.9	12.4	10.7	9.3	8.3	7.5	6.2
43	14.6	12.1	10.4	9.1	8.1	7.3	6.1
44	14.2	11.9	10.2	8.9	7.9	7.1	5.9
45	13.9	11.6	10.0	8.7	7.7	7.0	5.8
46	13.7	11.4	9.8	8.6	7.6	6.9	5.7
47	13.4	11.2	9.6	8.4	7.4	6.7	5.6
48	13.1	10.9	9.3	8.2	7.3	6.6	5.5
50	12.6	10.5	9.0	7.9	7.0	6.3	5.2
52	12.1	10.1	8.6	7.6	6.7	6.0	5.0
54	11.6	9.7	8.3	7.3	6.5	5.8	4.8

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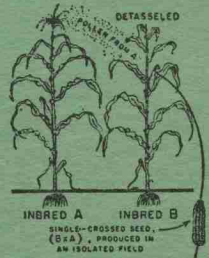
FIRST YEAR



AT LEAST 5 YEARS ARE NEEDED TO PRODUCE IMBREDS A, B, C, & D FROM FARM VARIETIES.

FIRST YEAR

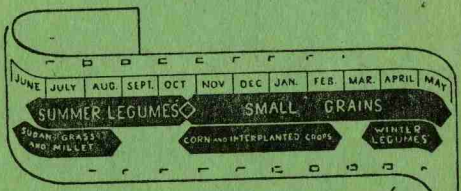
SECOND YEAR

T CROSS SAME AS DOUBLE CROSS EXCEPT CxD IS REPLACED BY FARM VARIETY.

FARMER BUYS THIS DOUBLE CROSS SEED FOR PLANTING GENERAL CROP. GENERAL CROP CORN MUST NOT BE USED FOR PLANTING SEED.

GRAZING CROPS

Build This GRAZING CALENDAR



Around the

PERMAMENT PASTURE LIKE THIS

To Reduce Hay and Feed Requirements

For Further Information See Your County Agent

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