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DECEMBER, 1943

(REPRINT) EXTENSION CIRCULAR NO. 239

GRAZING CROPS FOR POULTRY

BIBLIOTHEEK INST.
voor PLUIMVEEONDERZOEK
„HET SPELDERHOLT”
BEEKBERGEN

R178

MONTHS DURING WHICH CERTAIN CROPS WILL SUPPLY GRAZING

CROP	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
ITALIAN RYE GRASS												
CRIMSON CLOVER												
ALFALFA												
PERMANENT GRASS SOD												
ABRUZZI RYE												
OATS & BARLEY												
WHEAT												
LESPEDEZA												
RAPE												
COWPEAS & SOY BEANS												



White Leghorns Grazing on Rye Grass and Clover Range

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING
OF THE
UNIVERSITY OF NORTH CAROLINA
AND
U. S. DEPARTMENT OF AGRICULTURE, CO-OPERATING
N. C. AGRICULTURAL EXTENSION SERVICE
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IN FURTHERANCE OF THE ACTS OF CONGRESS OF MAY 8 AND JUNE 30, 1914

VITAMINS IN POULTRY NUTRITION

Vitamin	Deficiency Produces	Destroyed By	Distribution
A	Nutritional Roup, Xerophthalmia, Stunted growth, Faulty egg-production, Low hatchability, Urates in ureters.	Sunlight. Oxidation. Properly stored keeps 26 years. Not destroyed by cooking.	Egg yolk, milk fat, cod liver oil, green grass, alfalfa hay, alfalfa meal, clover hay, green barley, sprouted barley, soybean hay, kale, tomatoes, carrots, yellow corn. Associated with yellow color in plants. Salmon oil.
B* or B ₁	Polynneuritis, Stunted growth, Loss of appetite, Faulty digestion, Faulty feather production.	Not easily destroyed by oxidation or aging. Heat to 120° C in 1 hour. Not destroyed by ordinary cooking.	Wheat germ, alfalfa and clover leaves, spinach, cabbage, turnips, tomatoes, dried yeast, eggs, whole cereals, (corn, wheat, oats). Widely distributed in poultry feeds.
B ₂ or G	Pellagrous-like condition.	Not easily destroyed by heat. More stable than B.	Yeast, milk, lettuce, eggs, tomatoes, wheat germ.
C	Not essential to poultry.**		
D	Leg weakness (Rickets) Decreased egg production, Thin-shelled eggs, Enlarged parathyroid, Respiratory quotient decreased.	Prolonged irradiation, rather resistant to aging. Weathering of hay. More stable than A.	Cod liver oil, egg yolk, green alfalfa, green oat sprouts, legume hays generally and leafy part of plants have small amount. Hay exposed to sun in curing has more of D. Sunlight and artificial ultra-violet light manufacture this vitamin.
E	Probably sterility and low hatchability.	Not easily destroyed. Rancidity.	Wheat germ, oats, dried alfalfa, green leaves, legume hays generally, cereals, eggs. Widely distributed.

* What was originally known as Vitamin B has been shown to consist of several factors.
 ** No deficiency disease is found in poultry when Vitamin C is absent, but the feathers are healthier when this vitamin is in the feed. Chickens no doubt manufacture Vitamin C in their bodies.

Prepared by G. H. SATTERFIELD, Associate Professor Biochemistry
 N. C. State College, Fall 1931.

GRAZING CROPS FOR POULTRY

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There exists no problem more important in poultry husbandry, than that of supplying an ample supply of succulent green feed for as great a portion of the year as possible. This is one of nature's natural and best foods for poultry as well as other stock, and which if lacking must be supplied by feed supplements to make up the deficiency. This process is uneconomical in many cases if all factors be considered.

Green feed supplies proteins, minerals, and vitamins, and in addition provides bulk to the food, a factor which is highly necessary for efficient digestion. Feeding poultry should be carried out on a well-organized basis with three viewpoints in mind—efficiency, effectiveness and economy. In a liberal supply of succulent green feed there is present those factors which with a well-balanced mash and careful feeding of scratch should produce these requirements.

VITAMIN REQUIREMENTS FOR POULTRY

Vitamins are unknown substances found in certain foods which are necessary for the normal development of the young and for the maintenance of health. The entire absence of vitamins from the diet of poultry results in various pathological conditions which are grouped under the general term "Deficiency Diseases." The necessary vitamins for poultry as known at the present time are as follows:

Vitamin A: The source of this vitamin for poultry is to be found in egg yolks, milk fat, cod liver oil, sardine oil and possibly other fish oils, green grass, alfalfa hay, alfalfa meal, clover hay, green barley, sprouted barley, soybean hay, kale, tomatoes, carrots, and yellow corn. When vitamin A is lacking in the ration, a condition known as Xerophthalmia (dry eyes) results. Supplements of feed stuffs rich in this vitamin usually correct this condition.

Vitamin B or B-1: This vitamin is known as the growth promoting vitamin, the lack of which results in a condition known as polyneuritis (inflammation of the nerves). This vitamin is found in wheat germs, alfalfa and clover leaves, cabbage, turnips, tomatoes, dried yeast, eggs and whole cereals (corn, wheat and oats). The carefully balanced ration should contain sufficient of this vitamin due to its wide distribution in the cereal crops. The same should apply to vitamin B-2 or G, the anti-pellagrous vitamin.

Vitamin D: This vitamin is known as the anti-rachitic vitamin, the lack of which in the ration tends to produce a condition known as rickets (leg weakness). This is very often found in developing chicks and sometimes in adults. The anti-rachitic vitamin is found in cod liver oil (biologically tested), egg yolks, green alfalfa, green oat sprouts, legume hays and sunlight.

Vitamin E: The anti-sterility vitamin is yet to be proven as a decisive factor in poultry production. It is very widely distributed in nature, being found abundantly in green crops, cereals, and dry, leguminous hays.

The very important place of sunlight in conjunction with green feed should not be overlooked, especially at hatching time, the combination of the balanced ration plus green feed and sunlight being highly necessary in the hatchability of eggs.

NUTRIENT FACTORS IN GREEN FEEDS

In addition to vitamins green feeds also supply other important elements as proteins, carbohydrates and minerals. The analyses noted by Henry and Morrison present the following relative percentage of the above elements in green crops.

DIGESTIVE NUTRIENTS OF FRESH GREEN ROUGHAGE*

	Total Dry Matter	Crude Protein	C. H.	Fat	Total	N. R.
Bermuda Grass	33.2	1.4	17.0	0.5	19.5	12.9
Blue Grass (Kentucky, headed out)	36.4	2.8	16.7	0.7	21.1	6.5
Orchard Grass	29.2	1.7	13.0	0.6	16.1	8.5
Red Top	39.3	1.9	20.0	0.6	23.3	11.3
Rye Grass (Italian)	27.1	1.8	12.7	0.7	16.1	7.9
Rye (5 inches high) ...	18.1	5.1	6.2	0.7	12.9	1.5
Alfalfa (before bloom) ..	19.9	3.5	7.5	0.3	11.7	2.3
Clover (crimson)	17.4	2.3	8.1	0.4	11.3	3.9
Clover (white)	21.8	3.1	9.6	0.5	13.8	3.5
Lespedeza	36.6	4.5	17.1	0.6	23.0	4.1

* Taken from Table 3, "Feeds and Feeding," by Henry & Morrison.

It is very probable that in a great number of instances, especially in the case of poultry production on the average farm, that little or no thought is given to the problem of green feed supplements, the birds largely shifting for themselves. There also exists the fallacious belief that anything that is green is satisfactory for poultry nutrition. While in the young and growing stages most green plants probably have some food value, it is also likely that after a certain stage of growth some of these, while appearing green and succulent, have become highly fibrous and are of little food value. In such cases, sunshine is the compensating factor, making up in a large way the deficiency in green feed.

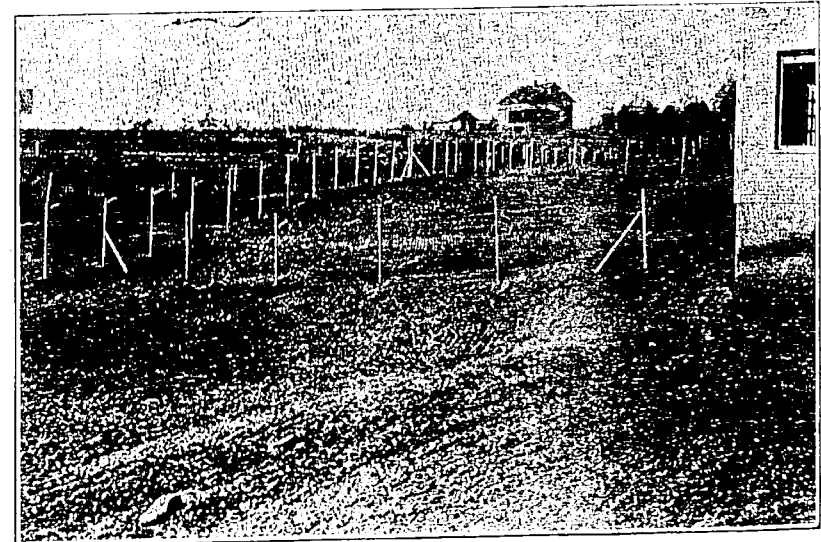
In commercial flocks it is highly necessary that supplementary feeding to the mash and grain be approached on a carefully considered basis. In many instances complete confinement with a mash reinforced with biologically tested cod liver oil is practiced with some degree of success. Varying opinions are advanced on the place of confinement of laying birds with a practically universal thought that this system should not be advocated for breeders. Some commercial poultrymen practice a partial confinement system, allowing the birds out for an hour or so each day, and having a

green range available for grazing purposes during this time. Both the above systems are pointed toward maximum egg production.

In all systems of production there arises the question of maintaining body vitality. Low vitality means a high death rate, low production and low hatchability of eggs. These factors cannot be reconciled with profitable poultry work and in the long run, better results will be secured, all factors being considered, if careful attention be paid to body vigor and the factors leading towards this.

At the North Carolina Station experimental work has been conducted on grazing crops for poultry with the following points in view:

1. Adaptation of certain grazing crops to soil and climatic conditions in North Carolina.
2. Adaptation of these crops for fall, winter, spring and summer grazing.



A carefully prepared seed bed is essential to all grazing crops.

3. Utilization of these green crops by poultry.
4. Possibilities of crop mixtures for both temporary and permanent grazing lots.

ESSENTIALS OF DESIRABLE GRAZING CROP

1. It must be tender, succulent, low in fiber, easily digested and relished by the birds.
 2. It must supply abundant grazing and remain tender over the greatest period of time.
 3. The cost of production must be relatively low.
- One of the most important points in growing grazing crops is to maintain a constant supply of tender succulent growth. To secure this the crop must make a rapid growth, and continue to grow over a long period. Aids in

securing this are a fertile moist soil, commercial fertilizer, a well-prepared seed bed, plenty of rainfall and the choice of the right crop. Grazing crops planted on poor land should be well-fertilized the first year or two, after that fertilization may be lighter or less frequent, as very little fertility is removed by grazing.

Grazing crops having these essentials for poultry are various grasses and legumes, cereals, rape, etc. For convenience these crops are grouped in this bulletin as Fall, Winter and Spring Grazing Crops and Summer Grazing Crops.

CROPS FOR FALL, WINTER AND SPRING GRAZING

Italian Rye Grass: This crop may be grown successfully in nearly every county in the state. It remains green and continues to grow throughout the winter and is not injured by zero weather. It is best adapted on well-drained loam, sandy loam, and clay loam soils, and does fairly well on clay soils.

A firm, well-prepared seed bed is essential in order to secure quick germination and rapid growth. Satisfactory stands have been secured by seeding on permanent grass sod, but this method is not recommended except where the grazing lot is seeded to a permanent grass mixture and other land is not available for rye grass.

Some commercial fertilizer is necessary unless the soil is very fertile. About 400 pounds an acre of a 10-4-4 should be used. Apparently hen manure is a fairly satisfactory fertilizer for rye grass as an abundant stand was secured on an unfertilized sod range on which the birds had ranged for two years.

September or early October seeding is advised, as it will supply grazing from about November 1 until June, while early spring seeding will furnish only about two months grazing.

The rate of seeding should be 40 pounds or more per acre. It pays to use plenty of seed. Drill or broadcast and cover about one-half inch deep.

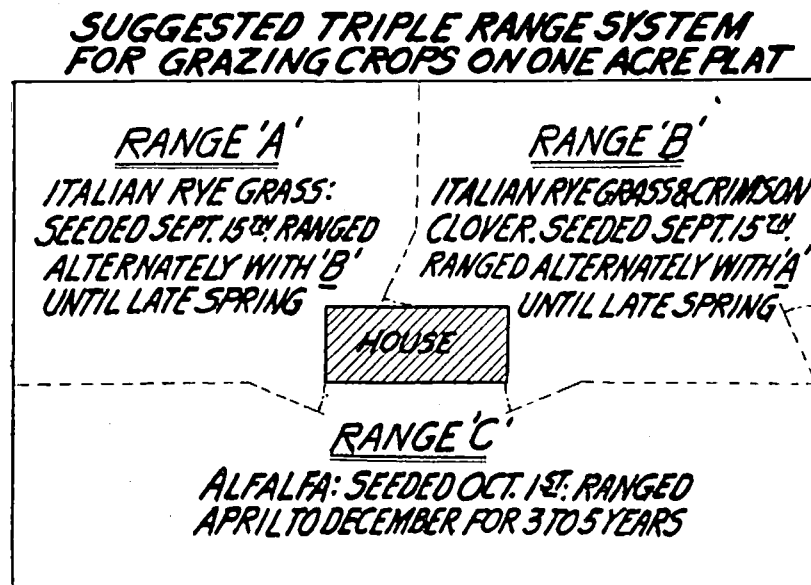
Italian rye grass is an annual plant but will sometimes reseed itself. However, a good grazing crop is more certain if it is seeded each fall.

It is advisable to have two lots seeded to rye grass so that the birds may be alternated between them.

Rye grass was the best single all around crop studied. The birds utilized rye grass in preference to crimson clover and alfalfa when all were available. The young shoots are extremely succulent and are eagerly sought by the birds. At the North Carolina Station rye grass furnished green grazing during the entire winter for the past two years with the exception of several spells of two or three days each when weather conditions compelled the confining of the birds. Rye grass, after being well established may be grazed to the ground level and will make a rapid new growth if the birds are removed and ample rainfall occurs. The summering of rye grass, like other crops, depends to a great extent on rainfall and the character of the soil, but in dry weather it goes to seed rapidly, but will reseed itself if the rainfall is abundant. Rye grass contains all the known necessary vitamins, besides having an excellent nutritive ratio as far as poultry is concerned.

While an acre of rye grass should provide ample range for at least 100 birds, it is of advantage to divide this area into at least two ranges in order to rest the ground and allow time for regrowth.

Crimson Clover: Seeded in September crimson clover will supply grazing over about the same period as Italian rye grass, but may not supply quite as good grazing during mid-winter as it may be bitten down by freezes and very little new growth is made at this time. Crimson clover can be grown successfully in the Coastal Plain, Piedmont, and Mountain areas, but it is not adapted to all soils. Lime is necessary for satisfactory growth, and unless the land has been limed within the past five years, it is advisable to supply 1 to 1½ tons per acre. Inoculation of the seed is also necessary if the land has never grown a crop of crimson clover, red, Alsike or white clover. A firm, well-prepared seed bed is essential, and should be prepared two to



Suggested triple range system for grazing crops on one-acre plat.

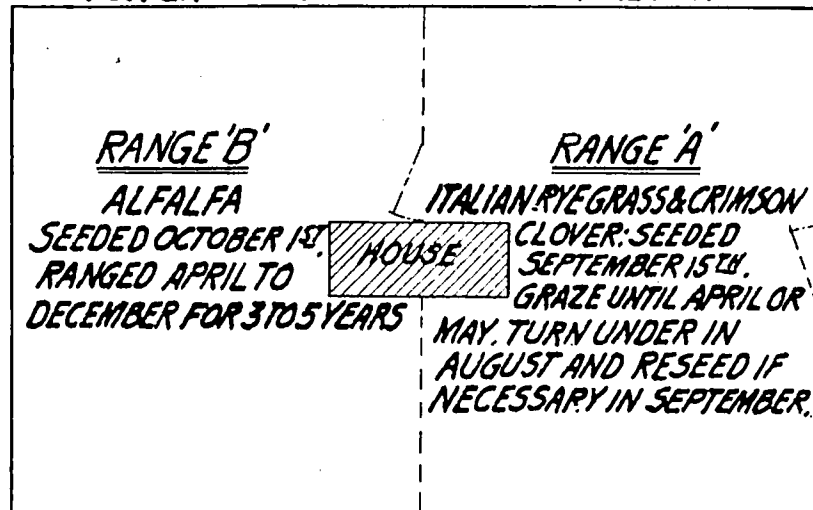
four weeks before seeding time. Apply 400 pounds of a complete fertilizer unless the land is very fertile. Use a 8-2-4 in the Coastal Plain, and a 10-2-4 in the Piedmont and Mountain areas. Seed during August in the Mountain section and September or early October in the Piedmont and Coastal Plain areas at the rate of 20 to 25 pounds per acre.

At the North Carolina Station crimson clover has been used to advantage both as a growing crop and as a soil builder. The birds prefer the clover to alfalfa, especially in the younger stage. The profuse leafing of the crop provides an abundance of succulent green feed and is relished by the birds. Apparently the birds can secure some desirable feed from crimson clover even after it has gone to seed as it was ranged for a limited time under such conditions with no ill results. The turning under of crimson clover after it

had gone to seed in the late spring on several plats furnished excellent autumn grazing. One objection to clover range, which is found in common with most other legumes, is the tendency in cases of heavy grazing toward dark yolks which are objected to by consumers of eggs.

Small Grains: These crops are more widely adapted than most grasses and legumes. At least one of them can be grown in any section and on almost any soil type in the state. They are not as satisfactory as rye grass, as they become hard and fibrous more quickly and do not supply grazing over as long a period, but they may be used to advantage as a supplement to rye grass. A good plan would be to seed the grazing lots in rye grass, crimson clover and alfalfa, and seed some cereal near by on which the flock may be turned if the rye grass gives out.

SUGGESTED DOUBLE RANGE SYSTEM FOR GRAZING CROPS ON ONE ACRE PLAT



Suggested double range system for grazing crops on one-acre plat.

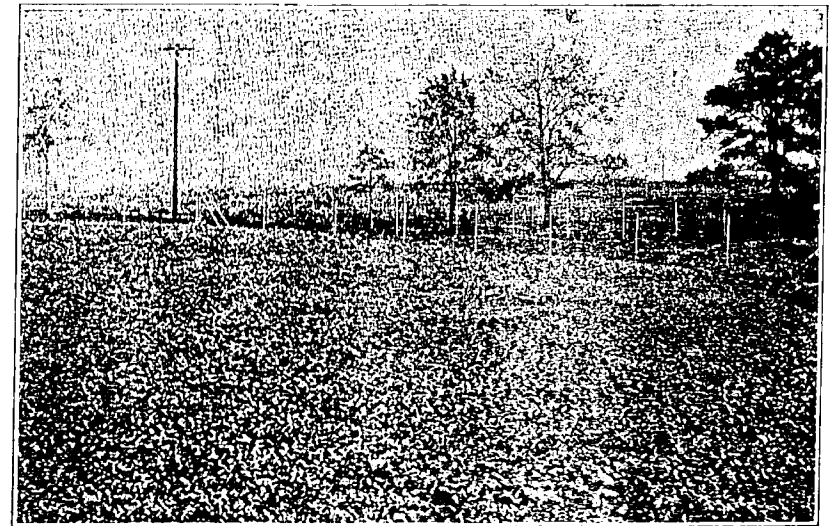
Oats are the first choice of the cereals for poultry grazing, with barley second. Seeded during late September or early October they will supply grazing for six to eight weeks during the fall and early winter and about the same during the spring. They will supply very little grazing during mid-winter as the leaves are bitten down and very little new growth takes place during cold weather.

Abruzzi Rye seeded early will make more growth during the fall than either oats or barley and will supply more grazing during the winter months because the frost and freezes seldom turn the leaves brown, but after March 1 it becomes tough.

Wheat seldom makes enough growth to supply much grazing before February 15 or March 1, unless it is seeded very early, but will supply from four to eight weeks grazing in the spring.

Care should be taken to supplement other feeds for these crops after they become fibrous, as in this stage the birds consuming such feeds may develop bound crops.

Rape is relished by poultry as long as the leaves remain tender. A fertile soil and plenty of moisture is necessary in order to secure rapid, tender growth. A slow growth produces a tough foliage. Do not attempt to grow rape on poor soils or dry natured soils. A well-prepared seed bed is essential. Fertilize unless the land is very fertile; seed during late summer and early spring and seed eight pounds per acre of Dwarf Essex variety. This may be grazed from October to May. This crop, while of the short lived type as far as usefulness for poultry goes, is one of the best crops available for cutting purposes. Due to profuse leafing and the limited period for which it can be grazed, it probably is not as economical, nor can it be classed as useful as rye grass or some of the legumes.



Rape is an excellent crop for cutting purposes. Cut area can be seen in the background.

Other Succulent Feeds for Winter: During very cold weather the flock is usually kept confined, but they should receive green or succulent feed every day. This can usually be supplied from the home vegetable garden. Collards, cabbage, carrots, turnips and other root crops will supply the needed vitamins.

CROPS FOR SUMMER GRAZING

July, August and September are the most difficult months to supply grazing crops. Due to high temperatures and often low rainfall, many of the grasses and legumes die out during this period. There also are available only a very limited number of crops which may be used for summer grazing, most of these being perennials. Alfalfa is by far the best crop for summer pasturage but, unfortunately, it is not adapted to all soils or sections of the

state. Therefore, grasses, other legumes, and permanent grass and legume mixtures must be depended on in some cases.

Alfalfa: This crop will supply abundant grazing from about March 1 until late in the fall. Frosts seldom injure the foliage, but hard freezes will kill the tender growth. The leaves are tender, succulent, high in protein and contain all the known necessary vitamins for poultry.

Alfalfa is not adapted to all soils of the state, but on many of the Piedmont farms, and some of the Mountain and Coastal Plain farms alfalfa may be grown very successfully, and should be grown whenever possible. If grown on the farm as a hay crop it may be cut and fed green and may be fed to advantage in racks as hay when a scarcity of green feed exists.

Alfalfa requires a deep, well-drained, fertile soil. Soils best suited for alfalfa are the loams and sandy loams of the Davidson, Cecil, Mecklenburg, and Georgeville series in the Piedmont section, Porters loam in the Mountains; and Marlboro, Orangeburg, Norfolk and Ruston loams in the Coastal Plain.

A firm, well-prepared seed bed is absolutely necessary and should be prepared for several weeks before seeding time.

Alfalfa requires a liberal supply of lime. At least two tons per acre should be applied before seeding unless the land has been well limed recently. Fertilize with 400 to 600 pounds of a 10-2-4 mixture; seed about September 20 to 30 at the rate of 25 to 30 pounds per acre of common alfalfa seed grown in Kansas, Utah, or Dakota; inoculate the seed unless the land has previously grown alfalfa, bur, sweet, or white clover. Alfalfa should be clipped three to five times each season to stimulate new growth.

Other Crops Which May Be Used to Supply Summer Grazing Are: Blue grass, orchard grass, redbtop, white clover, red clover, Bermuda grass and Dallis grass. These are all perennials and should be used for permanent sods. Under certain conditions some of them may be seeded alone, but better results are usually obtained by seeding mixtures of several grasses and legumes.

The following mixture per acre will supply grazing from late spring until frost in the upper Piedmont and Mountain areas:

Kentucky Blue Grass	5 pounds
Orchard grass	10 "
Red top	8 "
White clover	4 "
Alsike	4 "

For the lower Piedmont and Coastal Plain areas:

Orchard grass	10 pounds
Red top	10 "
White clover	5 "
Lespedeza	10 "

Meadow fescue and carpet grass may be added to the above mixture for the Southeastern Coastal Plain. On the coarse deep sandy soils of the Coastal Plain, Bermuda and Dallis grass are about the only crops that will supply summer grazing. During the hot, dry weather of August and Sep-

tember they become hard and fibrous. Bermuda and Dallis grass are not recommended for poultry where other permanent sod mixtures will grow successfully.

Poultry show a preference for grasses and other legumes over lespedeza, but lespedeza in a permanent sod mixture will remain green and will continue to grow during hot, dry spells when grasses and most legumes die down.

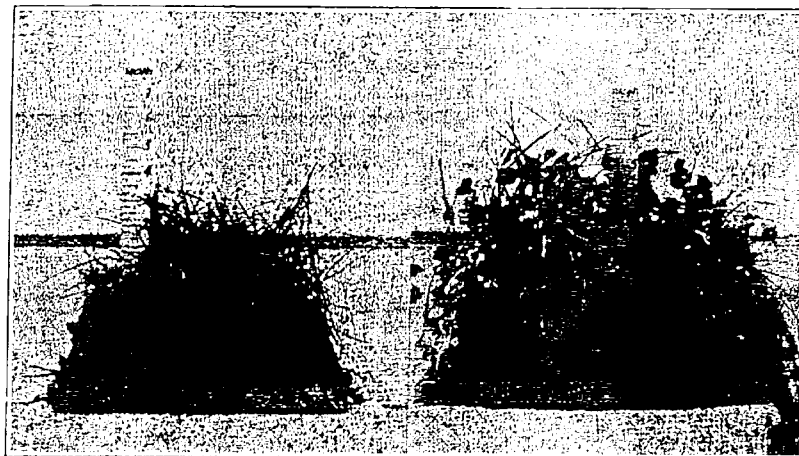
Cowpeas and soybeans may be used to supplement summer grazing if alfalfa or a permanent sod is not available. They may be sown after the rye grass dies and may be turned under in time to seed rye grass again in the fall.

At least one acre of land should be available for every 100 birds. This should be divided into two and preferably three runs, and seeded as follows:

Lot A—Rye grass.

Lot B—Crimson clover or rye grass.

Lot C—Alfalfa or permanent grass and legume mixture.



A B
Development of Grazing Crops. A—Italian rye grass; B—mixed crop of Italian rye grass and crimson clover. Both crops were sown October 9 and the picture taken seven weeks later. Rapid development and luxuriant foliage make these crops ideal for poultry grazing.

The birds should be alternated between Lots A and B. When Lot A has been grazed down closely, move them to Lot B and let Lot A recover. Lots A and B may be seeded to cowpeas or soybeans in June and back to rye grass or crimson clover in September.

MIXED SODS OF RYE GRASS AND CRIMSON CLOVER

Such a mixture may be used to advantage as it furnishes variety and a mixture that is extremely relished by the birds. The rye grass is usually first eaten by the birds, but is afforded protection by the clover while regrowth takes place. Seed at the rate of 25 pounds Italian rye grass and 10 to 15 pounds crimson clover per acre.