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REPORT OF COMMITTEE ON PROTEIN CONSERVATION

April 15, 1943

Representatives of the following organizations met at College Station March 31, 1943 to discuss the possibilities of conserving protein feed:

Texas and Southwestern Cattle Raisers' Association, Claude K. McGan, Pres.
Texas Sheep and Goat Raisers' Association, Vestel Askew, Sec.
Texas Jersey Cattle Club and other dairy cattle breed associations, D. T.
Texas Swine Breeders' Association, Mack Morgan, Pres. /Simons, Sec.
Texas Baby Chick Association, A. H. Demke, Executive Secy.
Texas Farm Bureau Federation
Texas Grange
Texas Feed Manufacturers' Assoc., W. R. Archer, representing Pres. of Assoc.
Texas Cottonseed Crushers' Assoc., A. L. Ward, Director, Educational Service
Animal protein industries, A. A. Lund, Manager, Armour and Co.
Regional Feed Industry Council, W. P. Bomar, Regional Conservation Chairman

Out of the discussions of the representatives present, the request was made and passed in the form of a motion, "That Dean Kyle, Director Williamson, and Director Conner appoint a committee to study carefully the best utilization of the available protein feeds in Texas for the various classes of livestock and poultry, and submit a report to this committee at the earliest possible date." Pursuant to this motion, a general committee and subcommittee for each of the various kinds of livestock were appointed from the Texas A. and M. College staff to study and recommend minimum requirements and to offer suggestions for making the most effective use of protein feeds.

The report of the A. and M. Committees was considered and approved by the State-wide organizations committee April 15, 1943. *

In making this report, it is recognized that the minimum needs for protein concentrates will vary for different classes and types of producers, depending on the amount and condition of available pasturage and roughage, and the amount and

*Those present at April 15 meeting:

W. P. Bomar, Regional Conservation Chairman
A. L. Ward, Director Educational Service, Texas Cottonseed Crushers' Assoc.
W. R. Archer, Texas Feed Manufacturers' Association
H. W. Gaulrapp, Master Texas Grange
Rufus Peeples, Member Educational Committee, Texas Swine Breeders' Assoc.
Vestel Askew, Secretary, Texas Sheep and Goat Raisers Assoc.
Claude K. McGan, Pres. Texas and Southwest Cattle Raisers' Assoc.

type of home or locally grown grain that is available. These differences have, in general, led producers to adopt feeding practices best suited to their local conditions. Some have found it most economical to mix their entire ration and have purchased cottonseed meal or other protein supplements for this purpose, while other producers have found it advantageous to purchase their concentrates mixed. Each producer should have the opportunity to purchase protein supplements to balance his home-grown feeds so as to permit the most efficient use of feeds produced on the farm or ranch. The producer should be guided in the compounding of rations and in the choice of feed materials by the principle of providing a practical balanced and economical ration. The protein supplements should be used only as necessary to meet the basic requirements of digestible protein according to feeding standards in common use. The present shortage of protein concentrates will not permit their use purely as sources of energy. Summarized briefly, the first demand on the protein feed supply is for the purpose of balancing rations based on home-grown feeds. The second demand is for the manufacture of mixed feeds for special classes of livestock and for particular feed situations.

The most effective conservation of limited protein supplies must ultimately be left with the livestock producer. It is, therefore, desirable that the distribution of protein concentrates be continued in the same forms or mixtures and on the same proportionate basis as was used for the 1941 crop and that protein conservation be effected by vigorously impressing all feeders with the necessity of holding their protein concentrate usage to the minimum standards recommended in this report.

Beef Cattle, Sheep, and Angora Goats

Texas producers of beef cattle, sheep, and Angora goats have recognized the deficiency of protein in the winter forage grasses and, when necessary, feed grazing animals limited amounts of protein-rich concentrates on the grass usually through limited periods during the winter and early spring. Under such a system of feeding and management, efficient production generally has been maintained.

Through the discriminate use of protein-rich feeds, range livestock producers avoid payment of high transportation costs on a large tonnage of low quality roughage feeds which are most generally produced on the local ranges and fields at a much cheaper cost. Protein-rich feeds are also used by feeders finishing beef cattle and sheep as needed to balance available grains and roughages.

This is a sound practice, but in instances when protein-rich feeds are low in price in relation to cost of carbohydrate concentrates, they have been used in larger amounts as a source of energy. The present shortage of protein-rich feeds will not permit this practice.

Adequate protein in the rations of range livestock results in (1) increased fertility in the breeding herds, (2) more rapid growth and development of young animals, and (3) healthier animals which are more resistant to parasite infestation.

In view of the shortage of protein-rich feeds, certain measures are suggested to producers to assist them in (1) the efficient use of protein supplements, and (2) providing adequate nutrition for the animals without waste. (By protein-rich feeds or supplements is meant cottonseed meal or cake, peanut meal or cake, soybean oil meal or cake, linseed meal or cake or any combination of them.)

General Provisions:

1. The producer must be free to compound rations suited to the class of livestock and to the purpose for which they may be fed.
2. The producer will be guided in the compounding of such rations and in the choice of feed materials by the principle of providing a practical, balanced and economical ration.
3. The minimum basic requirements for digestible protein as reported in recognized feeding standards have been used as a basis for these recommendations.
4. Range herds and flocks are usually fed only in case of rather acute need. Operators do not become alarmed over moderate weight losses in winter or drouth. Rarely are all of the animals fed. This being the case, the amount of protein supplements or other prepared feeds fed to a herd or flock may range all the way

from nothing to seemingly large amounts, depending upon the situation. Below are indicated the amounts of protein supplements to be used under situations as described.

Special Considerations, Beef Cattle:

1. Maintenance on average dry native pasturage or other low grade roughages: Dry cows, 1 pound protein supplement per head daily; bred cows, 1 1/2 pounds (increase to 2 pounds 60 days before calving); cows with calves at side, 2 1/2 pounds; calves and yearlings, 1 pound.
2. Aged steers wintered on range and destined for fattening on grass, 2 pounds protein supplement daily per head; supply grain as needed.
3. Steers or heifers being fattened in dry lot or on pasturage for slaughter at close of a normal fattening period, 2 to 2 1/2 pounds protein supplement daily per head. If legume hay is used as the only roughage, the amount of protein supplement may be reduced by one-half.
4. Cattle being grazed on Sudan or other green temporary summer pastures or cattle grazed on winter small grain pastures need not be fed protein supplements. Cattle being maintained over winter need not be fed protein supplements after spring grass and weeds appear in sufficient volume to afford fair fills. Grain may be used in subsequent feeding. Given a supply of high quality carbonaceous hays or bundle feeds or of good alfalfa or peanut hay, all cattle may be expected to winter in fair conditions without protein supplements. On abundant green winter grazing such as little barley, wild rye, rescue grass, or other green feed, protein supplements need not be fed - grains can be fed instead.
5. Vitamin A deficiency may be expected only under rather extreme conditions of drouth or in fattening in dry lot when roughages are used that do not have green color. In case of vitamin A deficiency, which is shown by night blindness, alfalfa hay may be used to correct the deficiency.
6. With scant allowance of protein supplements, it is suggested that mineral supplements high in phosphorus be supplied during winters or drouth. Equal parts

of feeding bone meal or defluorinated phosphates and salt mixed and supplied free-choice make a desirable supplement for most sections of the state. In some sections bone meal alone is required and in other sections a mixture of 2 parts bone meal and one part salt is necessary. In dry lot fattening with carbonaceous roughages, 1/10 pound of pulverized limestone or oyster shell daily per head should be mixed with the feed.

Special Considerations, Sheep and Angora Goats:

The same principles of feeding cattle apply to sheep and goats but smaller amounts of feed are involved.

1. Maintenance on average dry native pasturage or other low grade roughages: Dry ewes and wethers, 1/4 pound protein supplement daily per head; bred ewes, 2/5 pound (30 to 50 days before lambing); ewes with lambs, 1/2 pound. Goats to receive 1/2 the amounts allowed for sheep. Protein supplements not to be fed after green feed appears.

2. When legume roughages and cereal grains are available, farm flocks may be successfully wintered without the use of protein-rich supplements.

3. In creep feeding lambs for early market and with lambs following ewes on green pasturage, protein supplements not to be included in ration.

4. Lambs or yearlings being fattened in dry lot with carbonaceous roughages, 1/3 pound protein supplement daily per head. If legume hays are full fed, the protein supplement may be decreased to one-half the amount fed with carbonaceous roughages.

5. On ranges infested with bitterweed or other noxious plants; where cases of abortion appear in Angora goats two to four weeks prior to kidding; or where conditions of extreme drouth exists, increased quantities of protein should be fed.

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Livestock producers should always follow good management practices. In order to derive the greatest benefit from the limited amounts of protein-rich supplements available during the present emergency, it is important among all classes of live-

stock that herds and flocks be culled for the weak, aged, and unfit animals. Stock lightly, control parasites, provide shelter, improve water facilities, make available mineral mixtures high in phosphorus, plant temporary pastures (Sudan for summer, small grains for winter), cure hays with green color and put up a quantity of feed.

With the fullest utilization of home-grown feeds, supplemented when necessary with protein-rich concentrates, adequate nutrition and a large measure of economy may be effected through proper feeding during the present emergency. Anticipated beef and lamb production goals can be met only through adequate nutrition.

Dairy Cattle

Feeding Roughage

Plenty of good roughage will reduce the grain requirements and increase economy of production. Cows need two pounds of dry roughage or its equivalent in pasture or silage per hundred pounds of liveweight. Every 1 percent increase in the protein content of the roughage will reduce the required protein content of the grain mixture approximately 2 percent.

Pastures: An abundant supply of good pasturage is the most effective means of reducing the protein required in the grain mixture. One-half to two-thirds of the protein requirement of dairy cows can be furnished through supplying the herd with ample pastures. Provide one acre per cow of temporary pasture such as Sudan grass for late spring, summer and early fall; and oats, wheat or barley for fall, winter and early spring. Keep all pastures grazed or mowed to maintain maximum rate of growth and protein content.

Hay: Good hay can provide much of the protein requirements of the dairy herd, especially during the off-pasture seasons. Produce legume crops for hay where they are adapted because they are high in protein. Legumes should be cut in the bloom stage for hay production, Sudan or Johnson grass and cane should be cut for hay just as it starts to head for maximum yield and high protein content.

Silage: To secure the highest protein content and at the same time have a good quality silage, corn and non-sweet sorghums should be cut for silage in the stiff dough stage. Sweet sorghums should be cut in the hard dough stage.

Vitamins and minerals: Dairy cattle need adequate amounts of certain vitamins and minerals for the most efficient use of all the other feed nutrients they consume. Vitamin A is the vitamin most likely to be deficient in the ordinary ration and can be best supplied through providing adequate green pasturage. Salt, calcium and phosphorus are the mineral elements which usually should be added to the dairy ration. Salt can be supplied through the addition of 1 percent to the grain mixture and furnishing block salt as a lick. Adequate calcium can be supplied through the addition of 2 percent of ground limestone or ground oyster shell. Phosphorus is usually supplied in adequate amounts when cottonseed meal and wheat bran are used in the grain mixture. If these feeds are not used, it is best to use 2 percent of bone meal in the grain mixture and leave out the calcium supplement.

Good management: Good management practices result in a more efficient usage of all feeds consumed by the dairy herd.

- (a) Many tons of limited feed supplies are being wasted in feeding unprofitable producers at the expense of the good cows in the herd. Proper culling on basis of production and increased feeding of the good cows will increase total milk production and save feed and labor.
- (b) Maintain good health in the herd.
- (c) Provide adequate clean water at all times. It is essential to have cool water during hot weather and warm water during cold weather.
- (d) Provide the herd with shade during hot weather and shelter during the cold weather.
- (e) Milk cows at regular intervals and as rapidly as possible once the milking operation starts.

Minimum Protein Required in Grain Mixtures for Cows Fed
Different Types of Roughages

1. High Protein Roughages:

Alfalfa, peanut, soybean, cowpea hays, or good green pasturage.

(a) For Jersey and Guernsey herds averaging less than 2 gallons of milk daily, feed 3 pounds of home-grown grains (without any protein supplement) per gallon of milk. For herds averaging over 2 gallons of milk daily, feed 3 1/2 pounds of grain per gallon.

(b) For Holstein herds averaging less than 3 gallons of milk daily, feed 2 pounds of home-grown grains per gallon. For herds averaging over 3 gallons daily, feed 2 1/2 pounds of grain per gallon.

2. Medium Protein Roughages:

Equal parts of legume hays, as listed above, and low protein hays such as cane, Sudan, or Johnson grass hay or silage or fair pasture including Bermuda or other native green pasturage.

(a) For Jersey and Guernsey herds averaging less than 2 gallons daily, feed 3 pounds of a 12 percent protein grain mixture per gallon of milk. For herds averaging over 2 gallons daily, feed 3 1/2 pounds per gallon. Commercial mixed feeds of this kind should be labeled "for use with medium protein roughages".

(b) For Holstein herds averaging less than 3 gallons of milk daily, feed 2 pounds of a 12 percent protein grain mixture per gallon. For herds averaging over 3 gallons daily, feed 2 1/2 pounds of the grain mixture per gallon.

3. Low Protein Roughages:

Cane, Sudan, Johnson grass, prairie or Bermuda hay, or silage, or poor pasture such as dried grass of any type.

(a) For Jersey and Guernsey herds averaging less than 2 gallons of milk daily, feed 3 1/2 pounds of a 20 percent protein grain mixture per gallon. For herds averaging over 2 gallons daily, feed 3 3/4 pounds of an 18 percent protein grain mixture per gallon.

(b) For Holstein herds averaging less than 3 gallons of milk daily, feed 2 1/2 pounds of a 22 percent protein grain mixture per gallon. For herds averaging over 3 gallons of milk daily, feed 2 3/4 pounds of an 18 percent protein grain mixture per gallon.

In most cases it is necessary to mix some protein supplement with farm grains to secure a grain mixture containing 12 percent protein. It is always necessary to mix a protein supplement with any of the farm grains to secure a grain mixture containing 18 or 20 percent protein. For information on mixing grain mixtures of various levels of protein, see Extension Bulletin B-69, Feeding and Care of the Dairy Herd.

Swine

Texas pork producers can feed their farm grains to hogs profitably when suitable protein concentrates are provided in the proper proportions. Corn, grain sorghums, and other farm grains are low in the quantity and the quality of protein needed in the swine ration. Certain vitamins and minerals are also lacking in farm grains.

Hog producers can reduce the protein feed requirements, for most classes of hogs, from 30 to 50 percent provided the pastures are of high quality, and provided the yield is high per acre. Alfalfa and the clovers rank at the top as pastures for hogs, but rape, Sudan grass, oats and other small grains, cane, peanuts, cowpeas, and other crops will provide protein, mineral matter and vitamins. Pastures also help to keep the pigs thrifty by providing clean ground, also while grazing in the sunshine the pigs are supplied with vitamin D.

Proper management can also help to save protein supplement feeds. For example, feeds should not be allowed to become stale, sour, and unpalatable by feeding in poorly constructed self feeders, or by keeping more feed in the self feeder than can be eaten by the hogs in two or three days. Self feeders should be placed under sheds where rain or dust cannot contaminate the feed. Rats, birds, and other pests should be controlled by the use of self feeders with lids or otherwise so they can-

not eat the feed supplied the hogs. Where the hogs are fed a limited ration of grain, and the pasture is green and plentiful, less protein feed is required to balance the grain fed.

Protein Feeds

Protein supplement feeds fall into two general classes, viz: animal and vegetable. Some of the animal protein feeds are: tankage, meat scraps, fish meal, shrimp meal, skim milk, buttermilk. Some principal vegetable protein feeds used in swine rations are: cottonseed meal, soybean meal, peanut meal, linseed meal.

Protein supplements for most economical results should be made up of high quality protein concentrates. Hog producers need protein concentrates to balance their home-grown grains or carbohydrate feed. One good protein supplement can be mixed as follows:

Protein Supplement "A"

- 100 pounds of 60% protein tankage
- 200 pounds of 43% protein cottonseed meal or other vegetable protein feeds
- 75 pounds of 14% protein green alfalfa meal

Protein Supplement "B"

If tankage or meat scrap are not available, protein supplement "B" may be used. Supplement "B" cannot be expected to give as good results as Supplement "A". It is mixed as follows: 300 pounds of one or more of the vegetable protein feeds such as cottonseed meal, soybean meal, peanut meal, or linseed meal, and 100 pounds of 14 percent green alfalfa meal and 20 pounds of ground limestone or ground oyster shell, and 2 pounds of salt. Supplement "B", however, is not recommended for pigs weighing less than 65 pounds.

Supplement "A" contains 41.6 percent crude protein. Many other protein supplement mixtures similar to "A" may be provided where feeds of similar quality and kind are used. The economy of swine rations ordinarily is directly related to the concentration and quality of the protein used to balance good quality farm grains.

Recommendations as to percent of crude protein needed in rations for economical pork production for different weight pigs to be full-fed for market are given in Table 1.

Complete hog rations to be fed straight may contain from 5 1/2 to 7 1/2 percent crude fiber without appreciably decreasing the efficiency or economy of the ration for fattening hogs. Where the crude fiber runs higher than 7 1/2 percent, the economy of the ration may be decreased.

Table 1. Proportion of Grain and Supplement "A" Needed to Prepare 100 Pounds of Complete Feed Mixtures for Hogs

Kind of pig	Kind of grain used with Supplement "A"						Percent crude protein in complete mixture
	Supplement "A"		Grain Supplement "A"		Supplement "A"		
	Corn	"A"	sorghum	"A"	Wheat	"A"	
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	
Young, growing pigs, weight in lbs.							
30 - 75	75	25	78	22	83	17	17
75 - 125	82	18	84	16	90	10	15
125 - 175	85	15	87	13	93	7	14
175 - 225	91	9	93	7	100	0	12
225 and over	93	7	95	5	100	0	11.3
Bred sows during first 3 months of gestation period	88	12	90	10	97	3	13
Bred sows during last 3 weeks of gestation period	82	18	84	16	90	10	15
Sows and litters	82	18	84	16	90	10	15
For growing young breeding stock	85	15	87	13	93	7	14

Although rations containing higher levels of protein than is recommended by the Texas A. and M. College in this report have been fed to hogs, we think that with a shortage of protein concentrate feeds, the levels given here can be used by swine producers with good results. Rations containing lower levels of protein than are recommended here can be expected to give correspondingly less economical results.

The protein supplement recommended here may be hand-fed, or may be self-fed free-choice along with farm-grown grain, or may be mixed in suitable proportions with ground grain as shown in Table 1. Where plenty of green pasture is available, the alfalfa meal may be left out of the protein supplement mixture.

Where skim milk is available, one gallon per pig per day will furnish all the protein supplement needed to balance the grain. Where 1/3 gallon of skim milk per pig per day is available, the animal protein can be eliminated from the protein supplement "A" given in this report.

A mineral mixture composed of 2 parts by weight of bone meal, 2 parts ground limestone or ground oyster shell, and 1 part of salt can be fed with good results in a box or feeder where the hogs can have access to the mineral at any time.

Poultry

Culling: In order to save feed we recommend more culling than is usually practiced. This should start with the eggs for incubation. Only eggs of standard size (chickens 24 ounces per dozen; turkeys 32 ounces per dozen) and free from abnormal shapes and shell texture should be used. The unsatisfactory chicken or turkey eggs should be used for market.

Cull the young birds when first hatched and during the first week to remove and destroy birds that are crippled, poorly hatched, or otherwise defective; do not waste feed on them. Remove chicks or poults that are not doing well during the growing season. Eat them if they are healthy and destroy them if diseased. Feed only thrifty birds that will make satisfactory use of the feed. Keep up this culling practice all through the growing season.

Discard any small weak pullets as they reach maturity and heavy coarse masculine pullets; neither of these types make profitable producers. Watch the hens carefully all through the laying year and take out any that develop grey eyes, the only exception being with Dark Cornish. Take out all sick hens as soon as observed; destroy all that are seriously sick. Isolate and treat for worms and lice any hens, which are only slightly sick or out of condition. Destroy all that do not show improvement within a few days.

Sell any hens in February or March that are not laying and do not appear to be coming into production. Improve quality and add weight before marketing them by pen feeding.

Better Sanitation and Disease Control Reduce Losses.

Poultry losses with resulting waste of feed may be greatly reduced by sanitation and disease control measures. If the surroundings are kept reasonably clean, the house and litter dry, the house well ventilated without drafts and kept free from mites and blue bugs, and the birds are kept reasonably free from lice and worms, the losses should be greatly reduced.

Use Home Produced Protein to the Maximum.

The amount of concentrated protein feeds needed for poultry may be reduced somewhat by the use of succulent green feed. Pasture from oats, wheat, or barley in winter and Bermuda and Sudan grass in summer supplies protein, vitamins A and riboflavin. All of these are needed by poultry. The value of these pastures is much greater if the plants are kept short either by pasturing reasonably heavy with poultry and other livestock or by mowing. Lawn clippings and pea green alfalfa hay are excellent for poultry.

Liquid skim milk, which cannot be used for human consumption, can replace up to 75 percent of the concentrated protein feeds if it is regularly available and enough can be supplied to furnish all of the liquids the birds require, in other words it must replace water. The milk dishes should be kept clean, also the litter around these containers should be free from contamination.

Feeding Recommendations

General: The minimum protein content recommendations for poultry feed are given in Table 2. Rate of growth and intensity of egg production are correlated very closely with the amount of protein the birds receive. Reducing the protein intake of young growing chicks below 18 percent or poults below 22 percent is not profitable. As chicks reach six weeks of age, about one part of grain may be added to three parts of their 18 or 22 percent starting mash. Reducing the protein content of the all-mash ration for laying hens below 15 percent or the laying mash to be fed with grains below 18 percent will lower egg production. With these two classes of poultry, a savings by the use of greens and milk and rigid culling are the greatest

helps in conserving the protein supply.

Pullets fed the protein levels recommended in Table 2 may grow somewhat slowly at first, but before they reach maturity, they will be making as rapid gains as though they were on a heavier protein feed; they usually come into production not more than two to four weeks after pullets receiving a heavier protein feed. Their body size will be satisfactory; they may lay larger eggs than pullets pushed on rich protein feed, and mortality caused by inverted oviducts will be reduced.

Feeding Young Chicks and Developing Pullets: Most poultrymen can best feed a good commercial starter to their baby chicks. It should contain approximately 18 percent protein. As already suggested, when the chicks reach six weeks of age, cracked grains may be gradually added to the starter until about one part of grain is used with three parts of starter. Poultrymen who have grain should change over to a protein supplement to be fed with grain. Part or all of the grain may be mixed with the protein supplement if desired. In no case should this high protein supplement be wasted. One pound of 30 percent protein supplement may be fed with 2 1/2 pounds of grain. One pound of 34 percent protein supplement and 1/2 pound of wheat gray shorts or wheat bran may be fed with 3 pounds of grain. When fed in the above proportion, no other grain is necessary.

Those who can secure various protein feeds may make a good 30 percent protein supplement by using the following ingredients in the proportions given: 7 1/2 pounds of 50 percent protein meat and bone scrap, 40 pounds of 44 percent protein toasted soybean oil meal, 20 pounds of wheat gray shorts, 18 pounds of wheat bran, 9 pounds of dehydrated alfalfa leaf meal, 4 pounds of bone meal, and 1 1/2 pounds salt. In a 30 percent protein supplement, for growing pullets only, 15 pounds of the 44 percent protein toasted soybean oil meal may be replaced by a mixture of 43 percent protein cottonseed meal and 43 percent protein peanut meal. Other poultry feed information may be secured from Texas A. and M. College.

Feeding Hens: Laying hens may be fed a mash containing 18 percent protein and a mixture of grains, using about equal parts of grain and mash but varying somewhat from time to time to get maximum consumption and satisfactory condition of the

birds. Those who have grains to market through their poultry can well use a 30 to 34 percent protein supplement. This may be fed as recommended above for pullets. If the feeding troughs are fixed so the birds will not waste the feed, part or all of this grain may be mixed with the supplement. Careful feeders usually prefer to feed some of the grain separate from the supplement.

Table 2. Protein Content Recommended for Poultry Feeds

Types of feeds and poultry to be fed	Minimum total protein for these emergency conditions	Minimum animal protein for these emergency conditions
	Percent	Percent
All-mash starter and broiler mashes	18.0	2.25
All-mash growing feed	15.5	1.25
Growing mash to be fed with grain	19.0	2.25
All-mash laying feed	15.0	1.25
Laying mash to be fed with grain	18.0	2.25
Poultry supplement to be fed with grain	30.0	3.90
Poultry supplement to be fed with grain	34.0	5.00
Turkey all-mash starter	22.0	2.75
Turkey all-mash growing feed	20.0	1.50
Turkey laying mash to be fed with grain	20.0	2.75

Protein Requirements for Various Classes of Poultry

Table 2 gives the recommended minimum animal protein requirements and the minimum total protein recommended for various classes of poultry under the present emergency war conditions. The recommendation for animal protein is an effort to distribute the available animal protein in such a way that a poultryman should receive satisfactory results and thus supply larger amounts of food for the war effort. These suggestions are based on supplementing this animal protein with a variety of

vegetable proteins in which soybean oil meal will make up at least one-half of the vegetable protein and including an adequate supply of vitamins and minerals.

If excessive amounts of protein are fed, the birds will use this extra protein in place of carbohydrates. This would be wasteful, and for that reason, we have tried to keep the recommendations within the minimum requirements of the birds.

Work Stock

In view of the shortage of protein concentrates the committee recommends that: satisfactory nutritional requirements for work stock may be met without the use of these protein concentrates through more general use of pastures either temporary or permanent, supplemented by the roughages and grains grown on the farm or ranch.

Hays may be made more nutritious, especially with regard to protein content if cut earlier in maturity than commonly done. Carbonaceous hays and oats are a good horse and mule feed. Corn or grain sorghums make a good grain ration for work stock where legume hays or abundant green forages are available.

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