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T. Sullivan

E. Gleaves

T. Hartung

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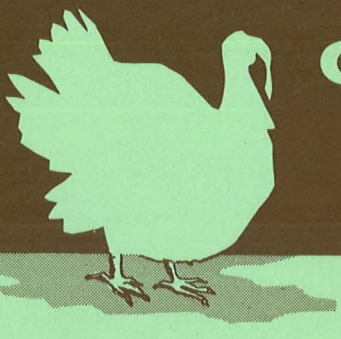

UNIVERSITY OF NEBRASKA COLLEGE OF AGRICULTURE AND HOME ECONOMICS
EXTENSION SERVICE
AND U. S. DEPARTMENT OF AGRICULTURE COOPERATING
E. F. FROLIK, DEAN J. L. ADAMS, DIRECTOR

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Turkey Management Guide

T. W. Sullivan, E. W. Gleaves and T. E. Hartung1/

LAND AND LOCATION

Well drained land within 50-100 miles of a market is an important asset to turkey production. A sandy soil is preferable. Compared to a heavy clay type soil it is easier to keep clean, dry and disease free.

Rolling-hill topography also furnishes well drained land adaptable to turkey production. Houses should be placed either on top of a low-lying hill or on the side (preferably the south) of higher hills. Avoid low-lying areas where drainage is a problem. Even though less land leveling may be required in low areas, this is just like putting the house in a floodplain.

The amount of land needed for brooding and rearing under range, semi-confinement and confinement conditions is outlined in Table 1. Values listed for land area needed should not be taken as absolute requirements but rather as guidelines to start the planning process.

GENERAL BUILDING RECOMMENDATIONS

Dimensions and Design

Modern successful brooder and confinement rearing houses are 30 to 40 feet wide. Wider houses have been used but ventilation of such houses becomes a problem. With either natural or forced ventilation, a wide house is subject to dead-air pockets and poor ventilation resulting in increased mortality and decreased production efficiency.

1/ T. W. Sullivan is Professor, Poultry Nutrition; E. W. Gleaves is Agricultural Extension Poultryman (Management); T. E. Hartung is Department Chairman, Department of Poultry Science.

Construction cost per square foot of floor area is usually higher for narrower houses. Therefore, a house width of 30 to 40 feet is a compromise between ventilation needs and construction costs.

The house can extend as many feet as necessary to accommodate any size flock up to 10,000 poults in the brooder or 5,000 hens or toms in confinement (see Table 1).

For example, a 40-foot-wide brooder house with enough floor space (1.25 x 10,000) to brood 10,000 poults would be 313 feet long. Flock size and house size should be limited to 10,000 poults or 5,000 adult birds to help prevent the outbreak and spread of disease.

The house must be strong enough to withstand Nebraska's winds and occasional heavy snowfalls. A 40 x 313-foot building can accumulate a tremendous tonnage of snow on the roof and it must carry this load until the snow is removed.

Turkey house plans are available for a small fee from the Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska 68503. When writing for plans ask for Midwest Plan 72748 (brooder house) with modifications for turkeys or Midwest Plan 72750 (confinement or semi-confinement house) with modifications for turkeys. These plans can be ordered also through the local county agent.

Materials and Insulation

New buildings can be of either wood-frame, steel-frame, wood-pole, steel-pole or masonry-block construction. However, masonry walls are not necessary or even convenient for confinement or semi-confinement rearing units.

Blocks could be used for the walls of the brooder house but they must be insulated as well as or better than wood walls so they result in little or no savings in construction and maintenance costs.

Table 1. Floor space and land recommendations per bird for brooding and rearing turkeys (sq. ft.)a/

Age	Rearing							
	Brooder House		Confinement		Semi-Confinement		Range	
	Floor	Landb/	Floor	Landb/	Floor	Landc/	Shelter	Landd/
wk.								
0-8	1.25	5.0	----	----	----	----	----	----
8-12	----	----	1.5	6.0	1.5	6.0	1.0	100.0
12-16	----	----	2.5	10.0	1.5	16.0	1.0	175.0
16-20	----	----	4.0	16.0	1.5	21.0	1.0	275.0
20-Market	----	----	5.0	20.0	1.5	26.0	1.0	350.0

a/ Growers who plan to raise turkeys to market weight must have building space and provide land area at the maximum recommendations for older birds even though there is some wasted space earlier in the growing period. Intermediate growers who plan to grow birds only to 8 or 12 weeks, then sell to a finish grower may find the intermediate breakdown helpful.

b/ Land area represents enough space for house plus space for a minimum of 100 feet between houses.

c/ Space for house, pen and a minimum of 100 feet between pens.

d/ Includes space for rotation of land with only 1/2 of the land being used in any one year.

Roof and Ceiling

Galvanized, corrugated steel is a good practical material for the roof of a turkey house. It is sturdy, reflective and durable. Any building material, including steel, must be insulated properly.

More insulation is required in the ceiling than in the sidewalls because warm air rises. In winter, the conserved heat in a turkey house is used two ways:

To warm incoming air so that more moisture can be removed.

To maintain house temperature above freezing where artificial heat isn't added.

If artificial heat is added to insulated houses, less fuel is required to keep the building temperature at the optimum level.

Sidewalls

With proper insulation, almost any building material can be used for the sidewalls of a turkey house. All building materials, wood, glass, steel, aluminum, concrete blocks, plastics and fiberglass have some insulating value.

Some materials are better insulators than others in terms of efficiency and cost. The insulation value of materials is represented numerically by the "R" value.

The R value represents the ability of materials to resist the flow of heat from the warm to the cold side. The higher the R value per inch of thickness, the better its insulation value. R values of 10 to 12 in the sidewalls and 14 to 16 in the ceiling are recommended for turkey brooder houses in Nebraska.

An R value of 8 to 10 in the sidewalls and 12 to 14 in the ceiling of environmental controlled confinement rearing houses is recommended. Confinement rearing units probably do not need insulation unless birds are to be raised the year around.

If birds are to be reared during December, January and February, insulation and mechanical ventilation will be necessary to achieve better environment control.

Basically, the R value is met by properly installing three inches of fiberglass batting in the sidewalls and four inches in the ceiling of brooder houses. Two inches in the sidewalls and three inches in the ceiling are adequate for confinement houses. Any other insulating material which meets recommended R values can be used.

Many insulating materials must be protected by a vapor barrier. The barrier prevents moisture from being absorbed by the insulating material, causing loss of insulation value. A vapor barrier should be installed on the "turkey" side of the insulation to prevent moisture produced by turkeys from being absorbed. Two excellent vapor barrier materials are polyethylene and aluminum.

However, turkeys, both young and old, will pick holes in these materials if they aren't covered with some hard material such as plywood or masonite. Since plywood and masonite can be waterproofed and are hard, they make excellent vapor barriers alone and other barriers are not needed.

Any material that is waterproof and can withstand the abuse of the turkeys will make a good vapor barrier.

Floor

From the standpoint of sanitation, ease of cleaning and labor requirements, a concrete floor is desirable in turkey brooder houses. However, to be of the most value the concrete should be 3 to 4 inches thick and reinforced with steel wire. This amounts to a considerable outlay of cash and, unfortunately, there is no documented evidence to indicate that the extra expenditure for concrete is economically feasible.

Most turkeymen do not use concrete in confinement and semi-confinement units. Some have concrete floors in their brooder house but even here there is some question of whether it will pay for itself.

Because of economic implications, it is impossible to say that everyone should have concrete floors. This question can be answered best for specific management situations.

On a new location where turkeys or chickens have not been raised before, a concrete floor is probably not needed. If poultry diseases have been a problem in past years, it would be wise to put in a concrete floor. Each producer will need to answer this question based upon his own economic situation.

Asphalt has been reported as a good alternative floor surface. It is less expensive and is almost as easy to clean as concrete.

Ventilation

Natural

Good ventilation in the brooder house consists of moving just enough air through to keep the litter dry. To move more air through a heated building than is needed is costly, because extra fuel is required to heat the unnecessary quantities of air being drawn through the building.

Little ventilation is required to keep the litter dry during the first few weeks of brooding. As the poults increase in size, however, more and more air must be moved through the building to carry off the increasing amount of moisture. An adequate ventilation system is extremely important for disease control and efficiency of production.

To obtain the proper ventilation of a turkey house the first important consideration is to keep the house narrow enough so that air can be moved through the house. A 30- to 40-foot wide house needs a continuous ridge ventilator if natural ventilation is to be used. The walls should be paneled so they can be opened and closed.

Mechanical

Because of the need to conserve heat and at the same time provide poults with fresh air many turkeymen are using mechanical or controlled ventilation in their brooder houses. Mechanical ventilation is being used also in confinement rearing units that operate all year. There is a trend toward greater control of the environment and this requires mechanical ventilation.

Natural ventilation methods cannot adequately remove moisture and conserve heat under severe winter conditions.

Either an exhaust or pressurized mechanical ventilating system can be used to ventilate turkey houses. Regardless of the system used the ventilation rates in Table 2 must be met.

Table 2. Feeder and waterer space recommendations and ventilation rates.

Age	Linear inches of space per turkey		Ventilation Rate at 1/8" static pressure c/
	Waterer a/	Feeder b/	
			Cubic ft/min/ turkey
0-2 weeks	0.5	1.0	1
2-4 weeks	0.5	1.0	2
4-6 weeks	1.0	2.0	3
6-8 weeks	1.0	2.0	3
8-12 weeks	1.0	2.0	4
12-16 weeks	1.0	2.0	5
16-20 weeks	1.0	2.5	6
20-market	1.0	2.5	6
Breeders	1.0	3.0	6-8

a/ Locate waterers so that each poult is always within 10 to 15 feet of water. More water space than is recommended above may be needed during hot weather. A sudden drop in water consumption often forecasts a possible disease problem.

b/ Location of feeders is just as important as amount of feeder space. Both pan or feeding space and feed storage capacity are important, especially with older turkeys.

c/ These ventilation rates do not provide for the adaptation of evaporative cooling for temperature control in the summer. In that case, greater allowances must be made. These values represent the average rate of air exchange over a 24-hour period. In extremely cold or hot weather these will need to be adjusted down or up within that 24-hour period.

Properly thermostated fans provide the requirements and turn on additional fans when needed. The use of time clocks with the thermostat adds greater flexibility during winter conditions to move air when thermostats have cut off the fans.

The specific ventilation system used in a particular house should be engineered for that house. There are too many variables, such as type of construction, topography of the land, surrounding buildings, purpose of the house and economic limitations, to design a general ventilation system that will work under all conditions.

Enlist Help

Once the decision has been made to build or remodel a turkey house, enlist help. Assistance in designing and planning can be obtained from the Departments of Agricultural Engineering and Poultry Science at the University of Nebraska in Lincoln.

There are other sources of help. Building contractors, lumber yards, feed companies, turkey hatcheries, breeders and turkey processing plants are all sources of information.

It is easy to change plans but very difficult and expensive to change a turkey house once it is constructed. Take the time and patience to plan properly and avoid as many mistakes as possible.

EQUIPMENT AND SUPPLIES

Brooding Equipment

Brooder Stove

In choosing a brooder, select one that is well made, equipped with a regulator to control temperature, an automatic shut-off valve in case pilot light goes out, and with ample capacity for the number of poults to be reared. Brooders usually accommodate about two-thirds of the rated capacity.

Types of brooders and some of their advantages and disadvantages are shown in Table 3.

Table 3. Types of brooders, advantages, disadvantages.

Brooder type	Advantage	Disadvantage
Gas-hover	1. Heat concentrated under hover, birds can find comfort.	1. Can't easily see all the poults under many types of hovers.
	2. Comparatively low fuel cost.	2. Comparatively high initial cost.
	3. Will operate efficiently for many years.	3. May require constant adjustment and cleaning.
	4. Provides ample heat during any type of weather.	4. Wet litter tends to accumulate around hover.
	5. Not subject to power interruptions.	5. Must continually raise and lower hover to work under it.
Electric-hover	1. Same as 1, 3 and 4 for gas-hover.	1. Same as 1,2,4 and 5 for gas-hover.
	2. Requires slightly less adjustment and cleaning than gas-hover.	2. Subject to power interruptions.
		3. Fuel cost may be high.
Electric infra-red bulbs	1. Low initial cost.	1. Excessive use of electricity.
	2. Dry litter.	2. Bulbs are short-lived.
	3. Visibility of poults.	3. Gives insufficient heat in extreme weather.
	4. Minimum of adjustment and cleaning.	4. Subject to power interruptions.
Gas infra-red	1. Visibility of poults.	1. Requires constant cleaning and adjustment.
	2. Dry litter.	2. Comparatively high initial cost.
	3. Easy to work around and with.	3. Doesn't give same degree of heat concentration as hover units.
	4. Same as 2, 3 and 4 for gas-hover.	

The brooder stove is important. It should be carefully checked to see that it is operating properly. The thermostat should be able to maintain a temperature of 95° F. for at least a 24-hour period. All the thermometers should be checked side by side for accuracy.

Cover the floor with 2 to 4 inches of clean, dry litter. This will maintain a dry environment so that disease organisms will have difficulty developing and spreading throughout the flock.

Materials used for litter should be highly absorbent, nonpalatable, low in cost and readily available. Wood shavings, crushed corn cobs, shredded cane and various other litters can be used.

Do not use sawdust or ground cobs with too much shuck. These litters have been observed to stimulate mold infection in turkeys.

Cover the litter with a rough finish paper for 5 to 7 days to prevent the eating of litter and the development of "spraddle legs." Neither feed bags nor slick paper should be used because poults will slip, eat strings or get caught in the bags.

Place a poult guard of cardboard or small mesh wire 1 foot high in a circle around the brooder 4 to 6 feet from the hover with overlapping ends--to enlarge the circle later. The guards are needed also with non-hover brooders and should be placed in a circle with a diameter of 12 to 14 feet around the brooder. The circle holds the birds near warm temperatures and makes it impossible for poults to pile up in a corner. The guard can usually be removed after about one week.

Arrange feeders and waterers in spoke like fashion within the circle.

The following starting equipment is needed:

1. Eight paper plates or new egg flats per 300 poults.

2. Five small 3 feet starting feeders per 300 poults.

3. Three large broiler feeders or three hanging feeders per 100 poults.

4. Seven one-quart or five one-gallon glass jar waterers per 300 poults.

5. Six foot, automatic, V-type, trough waterers can be used in place of the jar fountains. More attention may need to be given to the poults early to get them started drinking but much labor can be saved.

Start automatic waterers as low as possible, then raise them as the poults grow older. Change from the small feeders and waterers, if jars are used, to the larger ones as poults grow older. If automatic feeders and waterers are used follow the space requirements in Table 2.

Ventilating Equipment

An electric fan used for turkey house ventilation must be capable of running for a long period in dusty air without frequent attention or lubrication. This requires a fan with a totally enclosed motor. Motor bearings must have a lubricant sealed in them for the life of the motor or they must have large oil reservoirs that can hold enough oil for at least six months' operation without attention. Be sure to have a thermal overload switch in the motor or in the motor circuit to protect the motor from burning out.

Fans should be rated at 1/8 inch static pressure. Free air flow fans have a higher output of air per minute but 15 to 25% of the capacity is lost when those fans are installed in buildings. The fans should be controlled with thermostats and time clocks to meet the ventilation rate requirements in Table 2.

Range Rearing Equipment

Avoid feed wastage. The dollar loss from wastage during the growing phase can be enormous. To avoid this problem give careful attention to selection of feeders. Since most feed will be delivered to range in bulk, large self-feeders capable of holding 800 to 1,000 pounds of feed are needed.

Checklist for Feeders

1. Designed so that turkeys like to eat from them.

2. Feed depth in the bottom of the hopper should be easy and efficient to adjust.

3. Vertical or near vertical sides so that feed will drop down easily.

4. Five to seven inches of trough depth, to help reduce wastage.

5. Easy to clean.

6. Feed pan designed to reduce losses from wind and rain.

7. Constructed of heavy material which resists weather.

8. All edges should be rolled down. Makes feeder stronger and helps prevent workers from getting cut on sharp edges.

9. Should be built on strong skids.

10. Designed so that it will not overturn easily.

11. Lid should be fixed so that it can be opened and closed with ease.

12. Equipped with easily operated closing device to keep wind from blowing off the lid.

13. A feeder should handle mash or pellets equally well.

14. It should be manufactured by an established company from which parts and service are readily available.

Waterers should be of a type that are easily cleaned and will not leak. Here are a few of the factors which growers should check when purchasing range water fountains.

Checklist for Waterers

1. Constructed of heavy durable material.

2. Should be easy to level or adjust on hills and rolling land.

3. All edges should be rolled or smoothed down to prevent injury to birds.

4. Should be easy to raise or lower fountain as birds grow older.

5. Trough should be deep enough so that adequate water depth can be maintained at all times.

6. Bottom should be rounded or smoothed out to keep fountain clean and help prevent mold problems from developing.

7. An easily cleaned dependable float should be used. The float should have a guard which can be removed when it's necessary to clean or work on the fountain.

8. The float valve should work on low and high water pressures and should not clog easily when medication is used in the water.

9. A practical, durable device to prevent birds from roosting on water fountains should be provided.

10. Base should be wide enough so that birds cannot turn it over in the field.

11. Should be easy to clean and move from one part of a field to another. It should have proper fittings for convenience in connecting and disconnecting the water supply.

12. It should be manufactured by an established company from which parts and services are readily available.

Due to feed wastage, lack of feeder space and lack of proper watering equipment, many growers lose enough money (because of poor results) to buy new feeders and waterers every year. They try to patch up old equipment in an effort to save money. This is often false economy.

Growers should investigate the different types of watering and feeding equipment before they buy. If the points mentioned are reviewed, better equipment purchases can be made.

Range shelters (see Table 1 for space requirements) are needed to provide shade and protection for the birds. While some growers range turkeys without shelters, they would be ahead year after year to have them available. Shelters make it possible to use the range forage better and to distribute the manure evenly over the land.

Range shelter plans are provided in Nebraska Extension Circular 62-721. This circular can be obtained for a small fee by writing to the Department of Agricultural Engineering, East Campus, University of Nebraska, Lincoln, Nebraska 68503 or through your local county agent.

Other equipment

Other equipment needed includes a bulk feed truck or trailer and perhaps a manure spreader. These items of equipment can often be used in other farm enterprises so that it may not be necessary to charge their full cost to turkeys.

Confinement and Semi-Confinement

Equipment for confinement and semi-confinement rearing is essentially the same as for range. The one major exception is that range shelters are not needed in confinement and semi-confinement rearing. The feed and water space requirements are the same as for turkeys reared on range.

SOURCE OF STOCK

It is essential to obtain stock from a known disease-free source. Stock should originate from hatcheries which are members of the National Turkey Improvement Plan and are following a testing program to control egg-borne diseases including Pullorum, typhoid, paratyphoid and pleuropneumonia-like organism (P.P.L.O.).

It is highly desirable to obtain stock as close as possible to the farm to minimize the time lag from hatching to delivery. Turkey poults start much better within 48 hours after hatching than those with a greater delay.

Selection of variety and strain can be important. The first consideration must be health but performance of the turkey is very vital to success.

The Broad Breasted Bronze turkey has been the most popular variety of large turkeys grown. In recent years, however, the Broad Breasted White has taken over much of this popularity.

The white feathered bird permits greater flexibility in marketing age than the bronze feathered bird. To review the various performance standards of major sources, it is recommended that the results of the official Random Sample Tests be examined.

Copies of this test can be obtained from the Extension Poultryman's Office, University of Nebraska, Lincoln.

MANAGEMENT PRACTICES

Brooding

When poults arrive, they should be removed from the boxes and placed inside the brooder ring, near feed and water. They should be encouraged to start eating and drinking as soon as possible. If poults arrive damaged or a little rough, add one tablespoon of corn syrup per gallon of water for three days.

It may be necessary to dip beaks in water and feed to start them eating. Some may have to be force-fed. When you consider the amount of investment in young poults, the time spent in giving them special care and attention is worth it.

Watch carefully for piling--especially at dusk. This generally means the poults are uncomfortable, either too hot or too cold. Adjustment of the stoves and ventilating system may be needed. Suggested temperatures two inches above the litter at edge of brooder are shown below.

First week	93-95° F.
Second week	85-90
Third week	80-85
Fourth week	75-80
Fifth week	70-75

Maintain 70° F. until heat is no longer needed (usually by 6-7 weeks of age).

Check on poults two to three times during the night for the first few days. If they are comfortable they will be well dispersed within the brooder guard--some eating and drinking; others resting around the hover.

Use dim all-night lights for the first week of the brooding period. After the first week the poults need 6-14 hours of light. Research has shown that growth is best if 14 hours of light are supplied. Artificial light in the form

of morning lights is best. One 60-watt bulb for every 200 square feet of floor space is adequate. A dim light under each hover will also discourage crowding and piling. Excess light or sun spots entering through openings or windows will cause piling and cannibalism.

The most critical period in the life of poults is during the first week. Normally, over 50% of mortality occurs during this period. "Starve-outs" and piling are the two main problems. The best prevention is to give poults extra care and attention during this period.

Remove brooder guards and floor paper on the sixth day. Check under the paper for mildew spots and if they appear replace litter in that area. During cold weather enlarge brooder guards to include two or three stoves rather than taking them down suddenly. Remove the paper plates or egg flats. When the brooder guards are finally removed the corners of the brooder house should be "rounded" with the brooder guards.

Clean waterers daily. Gradually get poults to using automatic waterers as early as possible, then start removing a few of the small waterers by the second week.

Keep small feeders filled to the brim for the first week. During this period, a few poults saved by having feed easy to get will more than pay for the feed wasted. Put in a few large feeders when poults are a week to ten days old. Gradually add large feeders; and at two weeks start removing the small feeders.

Poults should be on large feeders by three to three and one-half weeks of age. After the first week feeders should only be filled one-half full to reduce feed wastage.

Give poults plenty of fresh air. Avoid chilling birds but after they are three weeks old, keep them on the cool side. Avoid drafts at all ages.

You may need to add more litter as birds get older. Sprinkle hydrated lime on the floor and work into the litter if it has a tendency to become damp. Remove wet, crusted litter from around feeders and waterers.

Keep insoluble grit before poults at all times as an aid in helping them digest fiber. Use chick size grit for the first ten days, then change to grower size. Start feeding coarse grit at six weeks. One grit feeder for each 300 poults is about right.

Take time each day to observe poults for signs of sickness. Watch for droopy birds, birds with bad eyes or swelling under the eyes. If you notice any symptoms of disease, get an accurate diagnosis immediately. In many instances you will need to call your serviceman.

In any flock, you are likely to have a few undersized, weak birds which cannot compete for feed and water. These birds should be placed in a small pen by themselves to reduce cannibalism. If given an opportunity, many of them will develop into top grade turkeys.

Three Systems of Rearing Turkeys

In the past range rearing has been the most popular method in Nebraska. However, the trend now is to raise turkeys over a greater period of the year to permit better utilization of brooding facilities with several broods and to satisfy the needs of turkey processing plants to extend their processing season. This trend is emphasizing a need to change to rearing methods which will protect the early and late turkeys from Nebraska elements.

Most range systems can best be used from May into early November but before and after this period it presents serious risks.

Systems being used to accomplish this involve semi-confinement and confinement rearing. A combination of either one of these systems along with range rearing is possible; however, if a unit is being started new, serious consideration should be given to using semi-confinement or confinement rearing without range rearing. See Table 4 for advantages and disadvantages of rearing systems.

Table 4. Major advantages and disadvantages of rearing systems.

System	Advantage	Disadvantages
Range	1. Green feed use (limited in Nebr.).	1. Increased risk of loss due to storms and predators.
	2. Lowest investment in structures.	2. More land area needed than semi-confinement and confinement.
	3. Control disease by moving.	3. More labor needed than semi-confinement and confinement.
	4. Natural shade can be utilized.	4. Weather extremes result in less gain and poor feed conversion compared to other systems.
Semi-Confinement	1. Less risk of loss than on range rearing due to storm and predators. Permits rearing early and late turkeys.	1. More risk of loss due to storms and predators than confinement rearing.
	2. Less labor needed than range rearing but same as confinement rearing.	2. Increased investment in structures compared to range rearing but less than confinement.
	3. Closer supervision of flocks than under range conditions.	3. More management skill is needed for disease prevention.
	4. Improvements in gain and feed conversion above range rearing.	4. More land needed than for confinement rearing.
Confinement	1. Minimum risk of loss from storms and predators. Suited to year round production of turkeys.	1. Increased investment in structures compared to the other two systems.
	2. Low labor requirements of turkeys.	2. Ventilation of structure is critical to avoid dust or wet conditions.
	3. Close supervision of flock is possible.	3. Management for disease prevention must be followed closely.
	4. Gain and feed conversion can be superior to range or semi-confinement.	4. Overcrowding can cause undergrading and increased disease losses.
	5. Least amount of land required.	5. System requires the use of litter in the structures.

Regardless of which system is selected the same amount of equipment (feeders and waterers) is needed. A major feature of both semi-confinement and confinement rearing compared to range rearing is the installation of permanent water lines serving the units. Frost proofing these lines makes possible a key part of raising early and late turkeys.

Range Guidelines

1. Land

   a. Well drained and preferably sandy.

   b. Allow 1 acre per 250 turkeys each year.

   c. Rotate land to permit one year of rest.

   d. Plant alfalfa or clover for permanent ranges. Native grasses may be used for permanent range. Yearly planting may use oats, barley, sorghum or wheat for green feed.

2. Shelter

   a. Provide 1 square foot of shelter area per turkey from 8 weeks to market.

   b. Roosting on the roofs should not be used but should be provided under the shelter raised 24" above the ground level.

   c. Move shelters, feeders and waterers not over 3 times during rearing period unless weather dictates otherwise.

   d. Shelters should be constructed to have low sides and to be accessible on all sides. Panels should be designed so that prevailing storm direction is covered on shelters for the young poult (8-9 weeks old). During the first few weeks on range it is desirable to move the shelters into a close arrangement to protect young turkeys. The

shelters and feeders can be moved apart after 11-12 weeks of age.

3. Fence tight the range area to reduce predator entry. Provide a perimeter electric fence line 10" to 18" above ground level and about 2 feet outside the poultry fencing to restrict predator entry.

4. Mount waterers on wire covered (1" x 2" welded wire) platforms to keep turkeys out of spilled water. Place waterers in shade if possible. Water space is very critical in range rearing during the heat of the summer.

Semi-Confinement Guidelines

1. Land

a. Select a well drained area.

b. Sandy soil type preferred but not required.

c. Locate pens to permit a buffer zone (50') between them.

d. Allow 20 square feet of pen space per turkey.

e. Plant a yearly cover green crop such as oats or barley if season permits.

f. Install a permanent, frostproof water line to each pen.

g. Limit pen size to 2,500-3,000 turkeys.

2. Shed

a. Allow 1 1/2 square feet of shed area per turkey.

b. Limit shed width to 30 feet, using a gable roof design and continuous ridge ventilation and keeping eave height to no more than 6'.

c. Hinged panels must be located on three sides so as to permit closing structure during the early age period (8-10 weeks of age) but then opening them so turkeys can move in freely from all sides as they are older.

d. Place 4" deep litter in the shed. Particularly important at the beginning age (7-8 weeks).

3. Fence the pen area tightly and de-wing turkeys at day old to confine them to pen areas. Electric fencing around each pen can be desirable. Pen width should be limited to 150 feet to confine turkeys in close proximity to the shed, feeders and waterers.

4. Mount waterers on wire covered (1" x 2" welded wire) platforms to keep turkeys out of spilled water. Feeders and waterers may be moved during the course of the rearing period. Waterers can be mounted on the fence outside of the pen after turkeys have adjusted to them (2 weeks).

5. Following each group of birds in the pen, the litter and manure should be scraped from the shed and the pen scraped to remove a "thin skin" of the surface. Allow ground to stand several weeks then turn over the top using a disk to expose clean ground. Allow this to stand exposed to the sun several weeks before planting or further use.

Confinement Guidelines

1. Land

a. Sufficient land will be needed for the structure and a buffer zone of 100 feet between buildings.

b. Land should permit ready drainage of water from the structures.

c. Install permanent frostproof water lines to each shed.

2. Shed

a. Allow 5 square feet of shed area per tom turkey or 4 square feet per hen turkey.

b. Limit shed width to 40 feet using a gable roof design having a continuous ridge ventilation and keeping side walls at a minimum height (4 feet). Two prime objectives must be accomplished in a pole shed for turkeys. First, it must afford protection against cold and heat; secondly, it must be well ventilated. Houses of extreme width and without ridge ventilation are unsatisfactory.

c. Enclose shed with 1" x 2" welded wire so that during warm months the shed can be ventilated from all sides. However, panels or curtains (plastic) must be available to close off walls which are exposed to prevailing storm direction when the turkeys are young (8-10 weeks old) and during the storm season.

3. Feeders and waterers can be installed along the sides for servicing or within the building. Locate waterers close to outside walls to minimize flooding if a hose breaks. A special valve can be installed in the water line in case a hose breaks. The sudden rush of water causes the valve to close and prevents flooding.

Feeding Recommendations

Starting Poults

Poults should be placed on feed and water as soon as possible after hatching. If this can be accomplished within 36 to 48 hours, litter eating and "starve-out" problems can be prevented. Feed can be made more accessible by placing small amounts on cardboard lids, paper plates, etc., for day-old poults. Some growers use colored feed or brightly colored marbles in feed and waterers to attract poults and stimulate eating and drinking.

Feed Systems

A complete pre-starter or starter feed should be provided during the first three or four weeks. Complete feeds may also be fed until birds are marketed. However, many turkey growers obtain a concentrate (36 to 40% protein) as crumbles or mash and blend this with homegrown grains. Poults should be changed gradually to this feeding program beginning at four to six weeks of age.

Grains should be ground or rolled before blending with concentrate; however, many growers blend whole milo or whole millet with their concentrate and obtain good results. Older turkeys (8 or 10 weeks to market) may be fed concentrate and grain in separate bulk feeders, however, this practice is not recommended.

It is important that the feed manufacturer's recommendations be followed with regard to changing feeds and mixing ratios.

Nutrient Requirements

The nutrient requirements of turkeys change with age. As turkeys get older they need less protein, vitamins and minerals and more energy. However, it is not practical or economical to change their feed every week. Protein and energy levels recommended for turkeys of different ages and sex are shown in Table 5.

Stress Feeding

It is sometimes desirable and necessary to feed higher levels of certain nutrients, antibiotics or other additives than are usually recommended. This practice is often called "stress feeding." Stress feeding may be beneficial:

When day-old poults have been transported long distances.

When a disease outbreak is suspected.

During a disease outbreak.

Table 5. Protein and energy levels recommended for turkeys of different ages and sex.

Age in weeks		Protein	Energy, Kcal/lb.	
Males	Females	(percent)	P. E.a/	M. E.b/
0-2	0-2	30	880	1,250
0-5	0-4	28	890	1,260
6-10	5-9	25	940	1,300
11-15	10-13	21	1,030	1,350
16-19	14-16	18	1,040	1,380
20-23	17-19	15	1,060	1,400
24-market	20-market	12	1,100	1,450

a/ Productive energy
b/ Metabolizable energy

Prior to and following movement of poults from the brooder house.

During severe weather (extremely hot or cool rainy periods).

Feeding to Efficient Market Weights

Turkeys should be marketed just as soon as they reach the desired market weights and finish. Body weight gains beyond this point are inefficient and expensive. Five to eight pounds of feed are often required for each pound of gain during the finishing period.

Holding birds two or three weeks beyond acceptable finish is usually not wise, unless a higher price is guaranteed. Heavy strain hens should be marketed at 18 to 22 weeks of age; heavy strain toms should usually be marketed at 24 to 28 weeks of age. The strain of turkey, feeding program and market specifications will determine the proper marketing age for each sex.

Debeaking

Debeaking to prevent cannibalism is recommended at three to six weeks of age. It is best to make debeaking a regular practice, however, some growers wait until there is an outbreak of cannibalism such as feather picking or vent picking.

It is best not to debeak at day-old, since this will interfere with the poult's ability to eat and cause more "starve-outs." Use an electric debeaking machine and remove about half of the upper beak, measuring from the nostril to the tip of the beak. Never remove more than this, especially when birds are to be moved to range. Feed and water levels should be at least 1/2 to 3/4 inches deep for debeaked birds.

Desnooding

This can be done at hatching time by pulling the snood off with the thumb and forefinger or by clipping with a scissors.

It is believed that desnooding reduces injuries to mature toms from fighting and thereby decreases the spread of erysipelas infection. The value of desnooding has been questioned; however, most hatcherymen will desnood poults for a small fee upon request.

Wing Clipping or De-winging

Wing clipping to prevent flight is practiced with both range and semi-confined turkeys. It has occasionally been responsible for considerable down-grading when birds are processed. This down-grading has apparently been due to bruising that occurs when birds attempt to fly and to poor healing and infection of the wing stub if improperly done.

To wing clip properly, remove the tip of one wing just beyond the outer joint at hatching time or within two weeks. It should be done preferably at boxing time so that poults are quiet in the box for quick clotting.

Moving Turkeys

When poults are about eight weeks of age they are ready to be moved from the brooder house to range, semi-confinement sheds or confinement buildings. Movement to range is most critical and should be carefully planned. Two things should be checked before moving poults:

The five-day or week's weather forecast.

The readiness of equipment.

Avoid moving poults when weather is threatening. Cool, wet and rainy weather places a severe stress on poults that have just been moved to range.

It is best to move in the early morning; this allows poults plenty of time to locate water, feed and shelter before nightfall. It is much easier on both birds and handlers to avoid moving during the heat of midday.

Some growers move about 1/3 of their poults the first morning; then skip a day or two and move the remainder of the flock. Large, wire-enclosed, four wheel trailers are best for moving turkeys to ranges. Moving trailers may be constructed so that birds can be loaded and unloaded by driving or herding. This system should require less labor and reduce injuries to poults.

Predator Control

A tight fence around the range area will reduce predator entry. A perimeter electric fence 10 to 18 inches above ground level and two or three feet outside the poultry fencing will further reduce predator entry.

The "weed chopper" type of fence operated off a 110-volt electric circuit has been used successfully. An electric fence of this type can be hazardous; it could be a fire hazard in dry weather and may produce a severe electric shock when the ground is wet.

This fence is most effective and quite safe when underlying vegetation is mowed regularly.

Some growers ward off predators with devices that produce loud noises at regular intervals. Examples of noise producing devices are firecrackers and calcium carbide-water guns.

Keeping a dog leashed near the range area is sometimes very effective in warding off predators.

Federal and possibly state assistance may be obtained when predator losses become severe. The availability of this assistance in Nebraska is provided by LB 135, enacted by the 1967 Unicameral.

Records

Complete and accurate records supply necessary information for making correct decisions. There is no substitute for a complete record of each flock raised; yet the majority of turkey producers do not have cost accounts to provide information required for making wise decisions.

In some cases the operator uses his records only to determine profit and loss. Records can tell much more than this, especially if they can be studied on a comparable basis with others in the same business.

Items that should be recorded for each flock are:

Poults - date started, number, strain and cost.

Feed - pounds fed, cost, beginning and ending inventories.

Litter - amount used and cost.

Fuel - amount used and cost.

Medication - kind, date(s) used and cost.

Pesticides - kind used, date used, where used and why.

Insurance - description and cost.

Hired labor - amount and cost.

Interest on investment.

Finance charges.

Depreciation on buildings and equipment.

Number of birds produced (loaded on trucks).

Number of sold.

Condemnation loss.

Gross returns.

DISEASE PREVENTION AND CONTROL

Preventive health programs are essential if losses from disease are to be held to a minimum during brooding and rearing periods.

The importance of getting poults off to a fast start and keeping them free of disease cannot be overemphasized. The estimated average value of disease losses is $100 per thousand turkeys started.

In addition, there are additional losses from condemnations during processing that increase the total disease loss to $160 per thousand birds started.

It is true that disease losses will probably never be reduced to zero. However, each grower should strive to reduce his loss or he will not succeed in the turkey business.

Brooder House Preparation

To get poults off to a fast start, the brooder house and equipment must be properly prepared.

1. Clean and sanitize feeders and waterers.

2. Remove litter and thoroughly wash and disinfect house and equipment with an approved disinfectant such as saponified cresol, quarternary ammonium compound, etc.

3. Air out brooder house for at least one or two weeks before new poults arrive. If a disease problem has existed previously, it may be desirable to fumigate the house with formalin and allow a longer break (3 to 4 weeks) before refilling.

4. Use at least three or four inches of litter over the entire floor area.

Daily Check List During Brooding Period

1. Allow no visitors in the brooder house. Provide a foot bath with fresh disinfectant.

2. Caretaker should have no contact with older birds on the farm without changing clothes between groups.

3. Check entire house for dead birds. Investigate and report any excessive losses.

4. Adjust equipment for comfort and convenience of poults.

5. Clean and disinfect water founts.

6. Watch poults' feed and water consumption and alertness for signs of trouble.

7. Adjust waterers and feeders and fill feeders (unless automatic equipment is used).

8. Remove any wet litter and add new.

9. Record daily losses.

10. Walk through flock several times daily and before retiring.

11. Dispose of any dead poults using a covered pit or by burning.

Daily Check List During Rearing Period

1. Allow no visitors.

2. Check entire house and/or range area for dead birds.

3. Record daily losses and remove dead birds. If loss is excessive, contact local veterinarian or diagnostic laboratory.

4. Adjust equipment for comfort of birds.

5. Clean and disinfect waterers.

6. Check and adjust waterers and feeders when necessary.

7. Remove wet litter and add new; eliminate potholes and stagnant pools of water on range areas.

8. Prevent introduction of disease. Bring no poultry equipment on to premises unless properly sanitized.

Control of Principal Diseases

The principal turkey diseases vary from year to year and one section of the country to another. Some of the more common turkey diseases are discussed in the following section. These diseases are not necessarily listed in the order of their importance.

Coccidiosis

Once this disease becomes a problem on a turkey farm, it is certain to be encountered each year. The organism will survive in the soil, floor and buildings from one season to the next.

Low-level feeding of a coccidostat during the first eight weeks is highly recommended on farms having a coccidiosis problem. This will keep the infection under control while the birds develop an immunity.

Blackhead

Blackhead is caused by a protozoan, Histomonas meleagridis, which is harbored by cecal worms and possibly earthworms. It is desirable to provide range rotation so turkeys will not be reared on the same ground two years in succession.

Blackhead can be transmitted directly or indirectly; young birds should not be reared near older birds. Neither should young birds be reared on range areas previously used by older birds--either chickens or turkeys.

A number of compounds are available for the prevention and treatment of Blackhead. The following should be carefully considered in choosing an anti-Blackhead compound.

Environmental conditions and their potential for Blackhead losses.

Preventive and treatment efficacy of the compound.

The compound's effect on growth.

Cost of the compound.

Erysipelas

Erysipelas, meaning "red skin," is a highly infectious disease occurring throughout the United States. It is caused by a bacterium that can live for a long time in the soil and is most prevalent in heavy soil areas.

The same organism causing erysipelas in turkeys is also responsible for erysipelas in swine and sheep. Therefore, poultry and these animals may infect each other.

Good sanitation, desnooding and debeaking of birds will help prevent the infection. Vaccination at an early age (eight weeks) is recommended if erysipelas is expected.

Fowl Cholera

Fowl cholera is a widespread contagious disease in the nation's turkey-growing areas. It is caused by the bacterium *Pasteurella multocida* and may cause heavy mortality within a few days.

Clean watering and feeding equipment frequently, rotate range areas and eliminate poorly drained spots.

Prevention of fowl cholera is a matter of sanitation and vaccination.

Cholera vaccines are not perfect but are being improved. Sulfa drugs provide effective treatment for outbreaks of the disease.

Airsacculitis or P.P.L.O.

Airsacculitis is a complex disease caused by *Mycoplasma gallisepticum* (MG.). The causative agent is egg transmitted and is widely distributed in chicken flocks and in certain turkey flocks.

The disease can be eliminated or greatly reduced by blood testing turkey breeder flocks. Infected flocks should be eliminated and strict management enforced.

The turkey producer should try to obtain his poults from a hatchery and breeder flock that are MG clean. If the poult source is unknown or suspect, MG losses can often be reduced by treating young poults with water-soluble Tylan or high levels of aureomycin, terramycin or Gallimycin.

These antibiotics are more effective and economical when given to young poults (day-old and 4 weeks of age) according to the manufacturer's directions.

Coliform Infections

Escherichia coli infections in turkeys may take the form of an enteritis condition, a blood-spread infection that involves many organs, or an air-sac infection. It may also be a combination of these conditions.

E. coli infections occur in all age groups but generally appear in turkeys over eight weeks old when they are subjected to other infections or undergoing stress.

These infections may result from polluted drinking water, dirty waterers, muddy water and other unsanitary conditions. Therefore, coliform infections may be prevented with clean drinking water, sanitary conditions and good management. High level feeding (100-200 grams/ton) of aureomycin, terramycin, penicillin-streptomycin or nitrofurans is an effective treatment.

Synovitis

Synovitis is any inflammation of the synovial sheath. This condition is observed primarily in the legs and hocks of turkeys. Inflammation occurs when disease organisms enter the synovial tissue following injury and rupture of blood vessels.

A number of disease agents (microorganisms) have been isolated from synovitis infected birds. Staphylococcus aureus is apparently the most common and damaging of these organisms. The disease may cause important economic losses by producing a large number of cripples, loss of weight and down-grading at marketing.

Strict sanitation and prevention of leg injuries will greatly reduce losses. Some antibiotics, especially novobiocin, have been reasonably effective for both prevention and treatment.

Salmonella Infections

This group of bacterial infections is among the most costly of turkey poult diseases. Of most significance are the large number of organisms that can cause paratyphoid.

The other important poult disease caused by Salmonella bacteria is pullorum. Prevention consists of obtaining disease-free poults from a reliable hatchery and eradicating the disease from adult flocks and from the premises. Salmonella infections have been treated successfully with nitrofurans, sulfa drugs and certain antibiotics.

Arizona Paracolon Infections

The paracolon bacteria comprise a large group of related organisms that have certain characteristics in common with the paratyphoids and also with the common coliforms. Most pathogenic paracolon organisms are placed in the group known as Arizona paracolons. These organisms are widely distributed in nature and have a host range which coincides with the Salmonella.

Paracolon host animals range from lizards to large animals. Other characteristics of these organisms include unusual viability, egg transmission and acute or rapid spread.

Paracolon infections have dramatically increased in the turkey producing areas of the country during the past four years. This has resulted from the infection becoming established in key turkey breeding flocks followed by distribution of hatching eggs to all sections of the country. Eradication of the disease is needed but will be very difficult.

A paracolon bacterin, which is unlawful in some states, is now available but is not completely reliable.

Whenever possible, growers should learn the previous "paracolon history" of his poult source and/or strain. The disease can be controlled by adhering to a sound sanitation and disease control program, which includes egg fumigation and effective preventive medication.

Paracolon infections have been treated successfully with nitrofurans, sulfa drugs and certain antibiotics.

Suggestions for Diagnosing Disease Problems

1. When daily mortality is excessive (more than one or two birds in a flock of several thousand), a disease problem may be developing.

2. If the disease problem can be clearly identified and some emergency treatment is indicated, this should

be started immediately. In many cases the problem cannot be identified and no treatment should be given until a diagnostic report is obtained.

3. A sample of birds for diagnostic purposes should be removed before any treatment begins. Selection of a sample of birds for the diagnostic laboratory should not be a culling operation. Birds submitted should be representative of the condition thought to be the flock problem. Submit three or four birds, or more if young poults are involved.

4. Diagnosis is often difficult if birds are submitted without adequate information. The following information should be available to the diagnostic laboratory.

Number in flock
Breed or strain
Age
Hatchery source
Type of buildings and equipment
Vaccination history
Feeding program
Illness first seen
Morbidity (number affected)
Mortality
Evidence of illness
Medication

5. Poultry disease problems may be diagnosed by the following in Nebraska.

Diagnostic Laboratory
Department of Veterinary Science
University of Nebraska
Lincoln, Nebraska 68503

Commercial Laboratories

Local Veterinarians