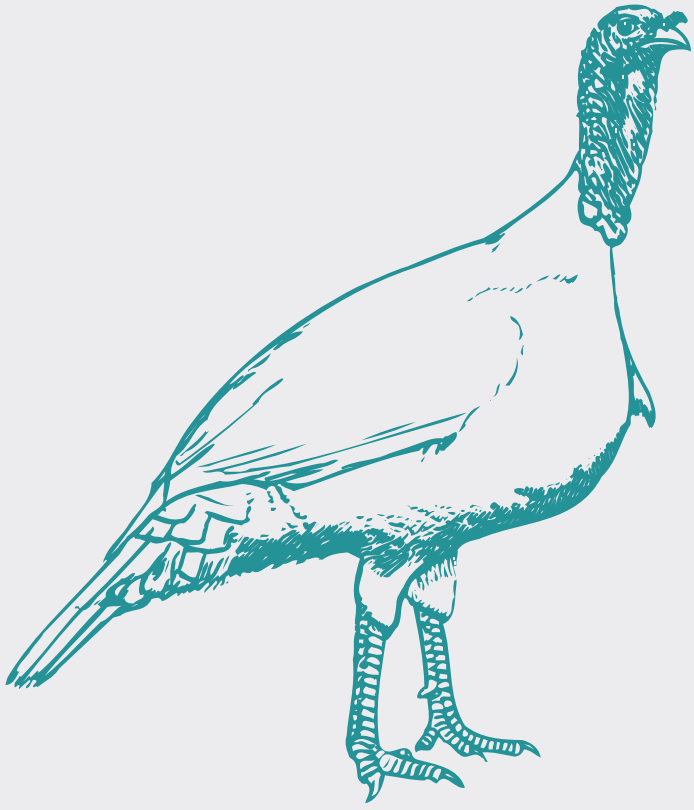
Animal Care Series:



TURKEY CARE PRACTICES

California Poultry Workgroup
University of California ◆ Cooperative Extension

FOREWORD

*"**Turkey Care Practices"*** is one of a series of University of California publications addressing the issue of animal care relating to food production in California. This publication is a joint effort of the University of California Cooperative Extension, poultry industry representatives, and members of the Poultry Workgroup.

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INTRODUCTION

Turkey management practices have evolved from years of practical experience coupled with scientific research. The care and management of turkey flocks depend on age, location, season, facilities, health, and many other factors. This publication was developed to outline currently acceptable practices for the care and rearing of turkeys for meat products and the breeding stock used to produce commercial poults. Continued research is necessary to provide additional information about the needs and preferences of turkeys along with exploring alternative or innovative practices. As new scientifically based economically feasible practices are developed, management should implement these methods into existing systems.

The well-being of the turkey is an ethical concern as well as an economical one. Management practices that promote animal care are probably the most effective from a production standpoint. Properly managed turkeys benefit by providing a higher quality product at a lower cost.

In California, the average meat production unit has a brooding and growing capacity for 50,000 birds at one time. Typically, these facilities manage 3.5 production cycles per year.

Nearly all turkeys in California are grown under contract with one of several large integrated companies or their subsidiaries. These large integrated companies own all or part of the following enterprises related to turkey production including breeders, hatchery, feed manufacturing, processing plant, brooding/growing facilities, and transportation services.

The number of turkeys produced in California peaked at 32 million in the early 1990's, then dropped to a low of 21 million by the mid 1990's reflecting over production problems for the national industry and financial problems for the California industry. Production costs in California are higher than in other areas making it difficult for the California industry to competitively produce turkey meat products for the consumer.

HATCHERY PRODUCTION PRACTICES

Turkey hatcheries, both commercial and those devoted to primary breeding, concentrate their efforts on maximizing the hatching of fertile eggs and the marketing of viable poults. Although environmental conditions for incubation are controlled automatically, these need to be supplemented with an alternative power source in case of disruption of the primary energy source. Hatcheries should have an ongoing training program to teach and update employees on the latest techniques for servicing poults and minimizing poult discomfort.

Servicing Poults

"Servicing poults" refers to the preparation of poults for shipment to the customer. Services available include: sexing, beak trimming, various vaccinations, the removal of the snood on tom poults and the removal of toe nails. Hatchery personnel are taught to remove poults from hatching trays and service them with a minimum of stress.

Beak trimming to prevent cannibalism is usually done in the hatchery using an electric arc trimmer or hot blade. An electric arc trimmer leaves a small hole in the upper beak; whereas the hot blade trimmer leaves a small indentation on top of the upper beak. Within a week, the tip of the upper beak will separate. Some producers still trim the upper beak between 10 and 21 days with a hot blade or clippers. Beak trimming should not coincide with vaccinations or other stressful activities. Iodine may be put in the drinking water the day of beak trimming and the day after to reduce the incidence of subsequent infection. The practice of desnooding for reduction of cannibalism, and toenail removal for identification and prevention of scratching should be conducted by trained and competent personnel.

Poult Vaccination

Vaccination either by injection or aerosol can be administered in the hatchery to protect the poult from disease agents prevalent in the environment to which the poult is being shipped. Vaccination by injection in the hatchery is considered less stressful for the poult than when administered in brooder or growing houses.

Poult Shipment

Poults awaiting shipment should be held in ventilated, temperature-controlled rooms in clean and sanitized poult boxes fitted with new pads. The boxes should have a lining such as excelsior pads or absorbent mats which provide secure footing. They are shipped to their destination soon after hatching in properly ventilated, temperature-controlled vehicles.

Because of the availability of yolk material to newly hatched poults, poults can be maintained without food or water up to 72 hours. However, the best industry practice is to place poults under brooder stoves (for details see page 6) with food and water within 24 hours after hatching. An exception would be poults shipped great distances either within the continental U.S. or to foreign countries.

Hatchery Waste

Hatchery waste is composed of infertile eggs, fertile but unhatched eggs, pipped eggs, and cull poults. In the case, of live cull poults, unhatched and pipped eggs, euthanasia is performed to produce a total and irreversible loss of consciousness. Instant loss of consciousness is the best measure of proper euthanasia. The most immediate loss of consciousness occurs with high speed maceration or grinding. Another acceptable method is carbon dioxide gas inhalation.

Hatchery waste may be disposed of in a variety of ways depending on local regulations and ordinances. Most hatchery waste is ground and\or crushed and taken to local landfills.

BROODER BARN PRACTICES

Brooding

The term brooding refers to the period of the poult's life extending from day old to about 6 weeks. Poults are usually placed in brooder rings for the first 5 to 6 days. Then from 7 days to 5 or 6 weeks of age depending on the sex of the bird and the integrator's guidelines, they are given from 1 to 1.5 square feet of floor space per bird. During this time, the poult needs supplemental heat, special starter feed, and protection from exposure to disease. One method of reducing disease exposure is by separately locating the brooding phase from growing and reproductive phases.

If it is necessary to have brooder barns on the same property with growing or breeding birds, they should be located up-wind from older birds and a minimum distance of a 0.5 to 1 mile away. Brooder barn personnel should be restricted from working part-time with older birds or interacting with personnel taking care of older birds.

Clean Out

Current industry standards for California include the washing and disinfection of all barns prior to receiving a new flock of turkeys. The used litter is pushed out of the barn and hauled away, preferably the same day. The lesser mealworm, *Alphitobius diaperinus* (Panzer) considered an agricultural pest, may have the opportunity to reinfest the barn being cleaned and other nearby facilities if the litter is not immediately removed. Utilizing the same litter for a new flock may be a possible source of infection from residual microbes of the previous flock. However, reuse of litter is an economic necessity with some companies.

The floor is swept and the area around the barn raked to remove litter and feathers before washing down the barn. The barn is usually washed thoroughly using plain water under high pressure. This washing usually removes at least 90-95% of residual microbial contaminants. Ceilings, walls and curtains subsequently are washed using a high pressure sprayer with water and a disinfectant such as quaternary ammonia. Frequently, the entire barn is then sprayed with another disinfectant.

Washed and disinfected brooder barns should be allowed to dry and air out before swabbing for bacterial cultures as a check on the effectiveness of the cleaning and disinfection. If harmful bacteria are found, the last disinfection is repeated. After disinfection, clean litter such as softwood shavings are placed in the barn. Rice hulls are not used by choice for brooding turkeys since poults may ingest these causing digestive dysfunction, and the dust from rice hulls

may predispose poults to aspergillosis and eye irritation. Good quality litter is free of excessive dust and/or mold. Cleaned and disinfected barns are off-limits to all personnel until it is time to re-stock the barn with a new flock.

Brooder Stoves

Brooder stoves are the source of supplemental heat provided poults from the time of placement until they are "ranged" or relocated to growing facilities. They are usually saucer-like with a diameter of 3 to 4 feet and with the concave surface facing the floor. The stove is suspended from the roof and can be raised or lowered as needed. Each stove has a thermostat controlled heat producing element attached to the underside of the saucer.

Brooder Guards

Brooder guards are used to keep poults close to brooder stoves for heat, food and water for the first 5 to 7 days of age or longer in colder weather. In the summer, brooder guards may be made of poultry netting, 18 inches high and placed in a 12 to 15 foot diameter around each stove. In colder seasons, solid wall brooder guards made with cardboard or other solid material are suitable. Brooder guards are used either for individual stoves or for units of 2 stoves.

Poult Placement

Industry prefers the delivery of poults as soon after hatching as possible. Poults are placed quickly but gently around the brooder stove. They should not be placed directly under the hot stove. Immediately after placing poults in brooder rings, personnel leave the brooder barn for about one hour to allow the poults time to settle down and find water, feed and the source of warmth.

Brooder Stove Arrangement and Temperature

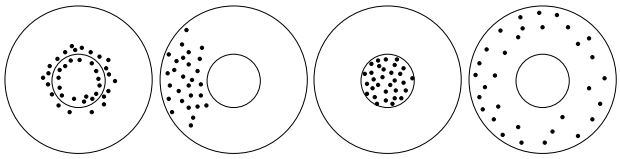
Traditionally, each stove has 3 waterers with or without satellite waterers and at least 3 feeders. To encourage day-old poults to start eating and drinking, 3 to 5 clean egg flats may be placed around each stove with feed sprinkled on each one.

Stove Adjustment and Temperature

Depending on the season and the temperature of the barn, stoves should be adjusted in such a manner as to provide a comfortable environment for the poults. The height of some brooder stoves may need to be increased slightly each day after 2 days of age. Stoves in curtain type buildings do not have to be raised as often, but do need to be adjusted to keep poults from roosting on them and burning their foot pads.

In general, each stove is set to produce a temperature of 90 to 95^{o}F at floor level under the stove and a room temperature of 75^{o}F when poults arrive. The temperature is lowered 5^{o}F per week for the next 3 weeks. However, actual

temperatures may vary since the best management practice is to adjust the temperature in accordance to the poult behavior as shown in the diagram below. Stoves are turned on at least 12 hours prior to poult arrival to assure that they are functioning and the proper room temperature is obtained. Feeders and waterers should be filled the day before poult delivery to attain the proper room temperature before poults arrive. The following schematics demonstrate the reaction of poults to temperature and indicate their comfort range:



Just Right	Too Drafty	Too Cold	Too Hot

Sanitation - Waterers and Feeders

Poult drinkers are routinely sanitized 2 or 3 times a day during the first 10 days to avoid respiratory and other disease problems. Often the drinking water is chlorinated to a level of 2 to 3 ppm total free chlorine measured at the drinkers. Dirty water should be removed and dumped outside the barn and each drinker scrubbed with a brush using an approved disinfectant.

The feed on filler flats is checked several times daily and added as needed. A small amount of poult grit may be placed on top of the feed to promote gizzard health and to avoid impaction. Feeders and waterers should be relocated each day to avoid a build up of manure around them. Accumulated fecal material around drinkers and feeders in the brooder rings should be removed 3 to 4 days after placement to promote healthy foot pads in poults.

The brooder ring is taken down at about 7 days of age or whenever the poults start jumping over the barrier. At this time, automatic feeders are turned on and filler flats are gradually moved to a position near the automatic feeder. About the 10th day, half of the feeder flats should be removed and the remainder the following day.

Ventilation

Fresh air is vital to the poults' survival and subsequent performance. There should be adequate ventilation to supply oxygen necessary for the birds' respiration, maintain comfortable temperatures for the birds without causing drafts, remove excess moisture, minimize dust, and maintain good litter conditions.

Light

Most producers do not restrict natural light for poults. Some will leave lights on all night for the first 2 or 3 nights only. Poults should be checked every 3 hours during the first 2 or 3 nights.

GROWING BARN PRACTICES

The growing phase refers to the period in a turkey's life between the brooding phase and market or the breeding phase. Housing concerns for commercial turkeys from the sixth to seventh week until market are similar to brooding including washing, disinfection, and litter as described previously. However, litter is removed from growing barns annually rather than after each brood.

Space

The amount of space allowed per bird varies with the environment, sex and market weight, but is generally 2.5 square feet per hen and 3.5 square feet per tom. Many operators give the toms the space vacated by hens since the latter go to market earlier. Hens are usually grown for 14 to 16 weeks and toms from 17 to 21 weeks before being marketed.

Moving Poults

Poults are routinely moved from the brooder barn to the growing barns on large trailers. Birds are herded onto the trailers and placed in divided sections to prevent scratching and piling. Hens and toms are moved separately and placed in separate barns. An accurate count assures the proper number of birds of each sex is placed in each barn. Approximately 10,000 hens or 7,000 toms are placed in the typical 50 by 500 foot barn.

Feeders and Waterers

Growing barns must have adult size feeders and waterers. The numbers of feeders and waterers should be determined by the number of linear inches of feeding and watering space required. Each type of feeder and waterer comes with a recommendation from the manufacturer. Individual producers may vary the numbers of feeders and waterers placed based on their experience, and the comfort and performance of their birds.

Ventilation

Ventilation is one of the most important considerations in brooding and growing turkeys. The minimum fresh air flow should be 1.5 cfm per pound of body weight at all ages when the barn is filled to capacity. Ventilation rates can be adjusted to remove dust, moisture and to provide adequate oxygen and temperature control. To remove moisture, the temperature inside the barn is allowed to increase from the body heat of the turkeys and/or with supplemental heat. Additional moisture is picked up by the warmed air and exhausted from the barn during normal ventilation.

Moving large volumes of cold, fresh air through a cold barn will not dry out the litter. In some cases, litter may become so dry that it needs to be dampened to reduce the production of dust. Properly operated foggers can be used to reduce ambient temperature and maintain litter moisture.

NUTRITION

Modern turkeys grow rapidly. A tom poult at day one weighs about .25 pound, and at 22 weeks weighs almost 37 pounds. The producer and the feed supplier work together to ensure that the proper nutrients are available to the flock in a palatable form. The producer is provided with a chart of the expected weights for various ages. This chart is developed from the breeder's expectations of the strain of turkey.

Nutritional requirements for growing turkeys and for breeders have been extensively researched. The modern turkey nutritionist uses formulas developed by scientific research and modifies these to meet the needs of a particular company and strain of turkey.

Poultry are fed diets comprised primarily of grain, protein supplements (e.g. soybean meal), minerals, vitamins, and fat. By-product ingredients such as wheat bran, bakery by-product meal, meat meal or dried brewers grains, are sometimes used when they are cost effective. Approved growth promoters (e.g. bacitracin) and coccidiostats may be added to feed in small amounts. Mold inhibitors are often added to prevent development for mycotoxins which are harmful to poultry. Hormones are not approved for poultry and are never included in the feed or water of commercial poultry.

Turkey flocks may utilize 4 to 8 different diets from hatch to market age. They may be fed on a slightly different schedule depending on their sex. Day old poults require a high protein, low energy diet. Diets gradually decrease protein and increase energy levels as they approach market age.

BIRD HEALTH

Health Maintenance Programs

The scientific definition of health in an animal is the absence of disease. Bacteria-free chickens in laboratory isolators grow about 15 percent faster than similar chickens in a "conventional" environment. This ideal weight gain under ideal conditions is impossible to achieve economically and commercially. Some short-term studies to limit bacteria using filtered-air positive pressure (FAPP) housing have been reported. However, the vast majority of poultry producers use immunization and biosecurity as major preventive measures for infectious diseases, with only occasional alternatives such as strategic medication for coccidiosis.

Immunization

The planned deliberate induction of immunity (as compared to the natural induction following unpredictable exposure to field infections) is one of the most beneficial and effective management tools available for the prevention or suppression of infectious disease.

There are two types of immunity: passive and active. Passive immunity occurs as antibodies in the yolk of developing embryos, derived from the maternal bloodstream, and is present for 2-4 weeks in the blood of newly hatched poults. The presence and the level of passive immunity in the poult is therefore dependent on the presence and level of antibodies in the maternal parent. The goal of breeder hen vaccination program is the production of high levels of passive immunity to poults. Passive immunity is generally effective against viral diseases, but less so or almost ineffective against bacterial infections, e.g., mycoplasmas or salmonellae in turkeys.

Active immunity occurs when an antigen is introduced and processed through the bird's immune system, resulting in various protective responses. These responses include the production of antibodies and/or macrophage cells which will act to protect the bird if the bird is re-exposed to that antigen or disease agent.

Active immunity can be produced either by living or inactivated antigens (vaccines and bacterins), or combinations of the two. Most living bacterial and viral antigens are either naturally occurring strains of low pathogenicity (mild), or pathogenic strains whose virulence has been reduced by passage in laboratory media (attenuated). Live vaccines can be administered either to individual birds, by injection or eyedrop or to large numbers of birds via the drinking water or by aerosol. Building up a high level of immunity often requires a second or third administration of vaccine, usually with a stronger vaccine strain on each occasion. Inactivated vaccines must be given by injection. These usually incorporate potent adjuvants which enhance the local

cellular reaction and therefore increase the level of immune response.

Development of Immunization Programs

The development of an immunization program and its incorporation into the management system of the flock should be built around knowledge of the diseases to which birds are likely to be exposed. It requires knowledge of the presence and the level of passive immunity, so immunization can be properly timed. Timing is also important so vaccines do not detract from each other's responses, or exacerbate their clinical effects. Vaccines should not be administered when other stressors are present in a flock.

Vaccines should be purchased and utilized only after consultation with vaccine manufacturers. Where serological monitoring tests are available, these should be routinely utilized to ensure an immune response has taken place.

It is particularly difficult to control infectious diseases on multi-age production systems. Since the sites are rarely or never free of stock, the continuous presence of infection in the site is probable. Live vaccines may travel between age groups at inappropriate times and may interfere with other vaccines or exacerbate a disease.

Limitations of Immunization

Immunization must not be a substitute for poor sanitation and biosecurity. The borderline between clinical good health and disease is very narrow. Thus, immunization programs may not totally protect birds which are stressed or are in unhygienic conditions. Deleterious conditions will also reduce productivity. Stressful conditions will render the birds more susceptible to disease organisms. In other words, animals that are constantly exposed to environmental diseases do not grow and produce as well as those in well managed environments.

Biosecurity

Biosecurity is the utilization of measures which can stop or slow down the introduction and spread of infection into or between components of production systems. These measures included:

- allow only necessary visitors to production sites;

- install fence enclosures;

- control movement of workers and equipment between barns, production sites and age groups;

- provide well-managed foot baths, showers and protective clothing at strategic points;

- maintain ongoing cleaning and disinfection programs, especially in hatcheries;

- reduce microbial load on trucks and equipment by washing and disinfecting at critical times;

- locate production sites strategically in relation to other production sites and movement of poultry to minimize transfer of disease;

- restrict contact of workers with other poultry, especially potential carriers of hazardous disease organisms;

- control rodents and wild birds effectively, both which are potential disease vectors;

- confine pets away from commercial poultry.

In situations where expensive breeders or experimental birds are housed, all visitors and employees must shower and change into clean farm clothing before entering the complex. A general rule for personnel sanitation for premises without showers is the use of coveralls over clothes, boots and a hat or hair net. It is important that only one facility be visited on any given day unless the visitor showers and changes clothes between facilities.

Cleaning and Disinfecting Houses and Equipment

When poultry are removed from houses, the buildings and equipment should be carefully cleaned and disinfected before new birds are introduced. Manure (including litter) should be removed from the immediate vicinity of the poultry houses, preferably to an off-site location. A successful cleaning and disinfection protocol should include:

1. Removal of all litter and manure.

2. Thorough wash down of the interior of the house and all equipment, preferably using a high-pressure washer.

3. Application of a suitable disinfectant solution.

Careful attention should be given to watering devices and water lines to be sure that these are free of disease agents. Water lines should be flushed and then a disinfectant solution pumped into the lines. These lines are closed and allowed to rest for at least 24 hours, and then thoroughly flushed to remove the disinfectant.

Stress and Pain

Stress can be measured objectively, e.g., heart rate, corticosteroid hormone levels, neutrophil to lymphocyte ratios, and behavior patterns. These parameters can indicate severe stress, particularly if acute, but the effect on a condition such as deprivation of a behavioral need, is still not possible to measure.

It is often argued that high flock

productivity in intensive systems is an excellent indicator of welfare. Productivity as a flock parameter is an indicator, but not an infallible measure; it does not consider individual birds nor does it measure immune status. There are indications that intense selection for growth rate *per se* may not, in the long run, be in the best interests of bird welfare, e.g., musculo-skeletal and other anatomical imbalances. On the other hand, comparison of the many individual components which contribute to welfare in intensive versus extensive production systems shows neither system is uniformly better than the other.

ENVIRONMENTAL ISSUES

Location of Facilities

The turkey industry in California has learned to operate with a minimum of complaints by properly selecting new building sites and maintaining those facilities once constructed. The turkey industry has made an effort to educate producers in selecting sites for turkey production units.

The industry developed guidelines for locating poultry facilities including set-backs, minimum distances to neighbors and the distance between existing poultry units. The distance between the proposed poultry facility and neighbors was formulated using average wind direction and velocities. The minimum distance between poultry facilities was established at two miles. However, this may vary depending upon local conditions.

Farmers have long been thought of as stewards of the land and animals. This section addresses those aspects of poultry management which may affect the working environment on the production premises and/or the environment of the district/ neighborhood.

Air Quality

The change in turkey management from fairly extensive systems to more intensive systems has resulted in the concentration of birds, along with the concentration of their waste products and contaminants. There is potential harm to animals and workers alike if airborne contaminants are not controlled.

Of the airborne contaminants, dust is the most obvious one. Poultry barn dust may be the product of manure, feed, litter, and/or dander. Turkey producers should attempt to maintain their litter moisture at about 30% to reduce the amount of dust. Litter dryer than 25% becomes dusty and can increase the risk for turkeys to become infected by molds. On the other hand, litter moisture of 40% or above allows the production of flies and an increase in the ammonia and other odors.

Although Cal/OSHA has established human exposure limits to ammonia at 25 ppm, it is almost never a problem in growing turkeys in the relatively mild and temperate climate of California. Ammonia levels approaching 25 ppm will have a negative effect on the performance of turkey flocks, producing irritation to the eye and respiratory system. Brooding turkey poults in the coldest part of the winter may lead to an increase in the ammonia level. This occurs when the brooder farm ventilation is reduced to conserve heat, thus allowing an accumulation of ammonia.

Respiratory protection in the

form of dust masks should be available to employees. Usually, the level of dust and ammonia in California is not sufficiently high to require the use of dust masks. Under certain circumstances, such as moving and loading turkeys in preparation for the trip to the processing plant, the dust level may be great enough to warrant respiratory protection in the form of a two-strap, OSHA-approved dust mask.

Waste Management

Manure is a natural by-product of all poultry operations. Poultry manure can be a valuable component of a well-integrated agricultural operation. Manure is an excellent soil amendment and provides revenue to the poultry producer. The method of manure management will vary with the type of operation under consideration.

Turkeys are maintained on litter to facilitate the evaporation of moisture and gases from the feces. The combination of litter and manure should be maintained in a balanced condition neither too wet nor too dry. Wet litter can result in foot pad and leg problems while excessively dry litter may lead to high levels of dust which can be irritating to birds and employees alike.

Litter management is equally important once it is removed from the barn and stored. The best situation is to simultaneously remove all litter from the barn and off the premises. There are two important reasons to remove litter as it comes from the barn. The most critical is to remove the old litter to avoid contamination of the new flock and to avoid reinfestation with beetles and other insects. The second is to be a good neighbor. Dust and odors are generated during the process of moving and piling the litter. Once the pile is established, it will seal, thus eliminating the escape of odor and dust.

If used litter must be stored for a short period of time, appropriate steps can be taken to reduce the possibility of producing nuisances such as flies or odors. Of particular concern is the potential for pollution of ground water or any part of the water shed.

Flies

The house fly, *Musca domestica*, is most active at temperatures between 80 to 90°F and at a humidity of approximately 40%. The house fly is inactive below 45°F and dies at temperatures below 32°F. The little house fly, *Fannia canicularis*, is active throughout the year, but is at its reproductive peak in the spring and fall. Therefore, during these two seasons, both types of flies tend to be problems for California turkey producers. The best fly abatement is the elimination of any areas conducive to fly breeding, such as wet areas in the litter, areas where feed is spilled, and stored manure that becomes wet. If stored manure is kept dry, there is very little likelihood of fly breeding. The recommended moisture level for manure is less than 33% as no fly emergence will take place at this level or lower.

Dead Bird Disposal

A certain number of turkeys die during the life of a flock. Carcasses are usually removed and recorded each morning from each barn. The mortality for the entire flock is calculated to help the manager decide if the mortality is within the normal range, or if there is a disease outbreak.

Burying - The turkey industry in California traditionally has disposed of dead birds by "on-site" burying in pits and trenches. The common method was a pit covered by a removable metal top with fly tight openings. After the pit was filled with carcasses, the metal top was relocated to a new pit nearby and the old pit was covered with soil.

The California Water Resources Board, in an effort to avoid ground water contamination, has made it extremely difficult for farmers to bury dead birds at new facilities or ones recently expanded. To comply, the producer must build an engineered disposal unit. If the soil type is unsuitable and the system does not work according to recommendations, the producer must develop an alternative method of disposal. Current regulations allow existing poultry facilities to continue burying dead birds until the producer plans to expand production or has a nuisance problem.

Incineration - Incinerators for disposal of carcasses have also been used in the past. Disadvantages included expense and labor. Recently, it became even more expensive because of increased stringent air pollution regulations.

Rendering - Today, in California, most turkey producers either transport dead birds to a renderer or have dead birds picked-up by a rendering service. To make this program successful, the producer should prepare an area at the edge of the facility where carcasses can be placed in a dumpster and moved outside the facility fence for pick-up. The dumpster is then cleaned and sanitized and brought back onto the facility. The renderer's pick-up truck does not enter the producer's facility and thus there is no biosecurity breach. Carcasses may also be hauled by the producer from the facility to the rendering plant. In this case, the producer's truck must enter the rendering plant and there is a possibility of a biosecurity breach.

Composting - Some producers may wish to utilize composting of their dead birds to keep it "on site" and reduce their biosecurity risk. Aside from the savings they will make by not having to pay for pick up or delivery of their dead birds, they will have the flexibility of being able to put their dead birds into the compost on a daily basis. Being able to take care of dead birds daily is often the most effective method of disposal during the long hot period of the year.

Landscaping

Merely the sight of an animal production facility, or especially of a manure storage area, may create the perception of nuisance in the minds of

some individuals. The producer may effectively screen these areas from view with the use of appropriate shrubs and trees. Vegetative screens can also be effective in keeping dust from leaving the premises.

HANDLING AND LOADING

Moving and Handling Turkeys

The moving of turkeys is one of the most difficult tasks the producer has to perform and thus turkey producers move their birds as little as possible. The least stressful move is from the hatchery to the brooding area. The next move from the brooding area to the growing area is more stressful for the young turkey. The number of birds is extensive and the birds must be walked onto a trailer to be moved. At the new growing area they will encounter different size and placement of feeders and waterers which requires adaptation.

Turkeys of all ages resist change, but this second move seems to be one of the hardest for them. Turkey handlers should be informed about the stress of moving and strive to handle and transport birds in an efficient manner which minimizes stress and injury.

The transportation of turkeys to market is an important part of the overall production process. Birds incorrectly caught or improperly placed in cages may sustain injuries and bruises which could be harmful to the birds as well as increase the downgrading. Therefore, all personnel involved in the bird catching and transport operation should be given appropriate training. The most important part of this training is the development of a positive attitude

Occasionally, turkey producers need to handle each turkey for procedures such as vaccination. The about why these methods are so important.

Turkeys are often moved at night to reduce the stress of heat and because the birds are more calm in the absence of light. Dimming of the barn lights has long been employed to create a less stressful environment for catching. Another practice is to use blue light which provides adequate light for the catching crew, but is perceived as very dim light by the birds. These practices minimize the stress on the birds and help prevent piling.

The cages used for live-haul are constructed to allow loading, transportation, and removal without injury to the birds. The entire truck and especially all the cages should be cleaned and disinfected after each load. The stocking density for each cage will depend on the size of the cage, the size of the birds, and transportation conditions (transit time and temperature). When the crate is full, there should be sufficient floor space so all birds can be resting on the floor simultaneously and have free head movement. Maximum stocking density can be used during cold weather. When the ambient temperature and humidity are too high, bird transport should be restricted to the cooler times of early morning and evening. Special care should be exercised to secure all cages thus eliminating the possibility of turkeys falling from the truck.

manner in which turkeys are held will affect their reaction to the restraint. Turkeys respond best to being held in a manner that provides support, which reduces the likelihood of struggling with the possibility of injuring wings or legs. Adult turkeys can be picked up by various methods depending on their age and the operation. Turkeys of all ages can easily be injured if picked up by one leg only. The best method involves securing both legs in one hand and grasping the turkey's far wing with the other.

Transportation Conditions

Common sense requires turkey producers to adjust their hauling schedules to avoid inclement weather. Should inclement weather develop in transit, the driver should be prepared to seek protection. Likewise, a loaded vehicle should not be left standing for any extended period of time. The length of time a loaded vehicle may be left standing depends on the circumstances. In the case of required stops (inspection stations, truck maintenance, etc.), the birds' safety should be considered and adequate steps taken to insure air circulation and protection from environmental extremes.

The shortest route between the live production facility and the processing plant may seem the most logical route, but there may be sound reasons to take longer routes. Although turkey producers are always concerned about feathers being lost from the live haul truck, it is especially serious if those feathers "contaminate" another food item. Feathers are also considered a nuisance by some neighbors and the considerate turkey producer takes all steps possible to avoid feathers being blown from the trucks.

SLAUGHTER

Procedures at processing plants are designed to prevent unnecessary pain and discomfort to the turkey, to insure optimal meat quality for the consumer, and to preserve the product's visual appeal.

The processing of turkeys begins with the unloading of the birds at the plant. Just as with loading the birds at the live production facility, great care should be taken in unloading so the birds are not injured or bruised. Birds are carefully removed from the transport truck and hung on shackles on the processing line going into the plant.

Shackles are size appropriate to the age, sex and species of bird being slaughtered. The instrument used for stunning is designed to deliver an electrical current to each bird that will render each bird insensible to pain. Once stunned, the birds are slaughtered by having their throats cut by hand or with a circular knife. Under certain circumstances related to a ritual (religious) practice there are exemptions for the method of stunning and slaughtering of the birds.

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GLOSSARY

Adjuvant	Additive to vaccines to enhance their immunological effectiveness.
Antibody	A protein molecule capable of combining specifically with an antigen.
Antigen	A substance foreign to the host animal, commonly a disease agent or vaccine which induces an immune response.
Attenuated	Strains of microorganisms with reduced virulence used to induce immunity.
Bacterin	A killed bacterial vaccine, consisting of a suspension of whole bacteria.
Biosecurity	A management system to minimize the pathogen exposure of flocks.
Brooding	Growing of poults with supplemental heat from day one to five to six weeks of age.
Brooder Guards	Rings of poultry netting or a solid material like masonite used to contain poults around the brooder stove or other heat source.
Composting	A natural decomposition process for organic wastes.
Condemnation weight	The weight of birds condemned in the processing plant.
Cull Poults	Poults not of saleable quality due to various defects
Desnooding	The removal of the snood from newly hatch poults.
Endotoxins	Toxins produced by bacteria.
Foggers	Water lines running the length of turkey barns with emitters placed at regular intervals to produce a cooling fog.
Gizzard	Turkey's muscular stomach; has a strong grinding ability.
Hen	Female turkey
Infertile	Eggs that do not contain a fertile embryonic unit and are incapable of developing.
Immunity	Resistance resulting from previous exposure to an infectious agent or antigen.
Integrated	A single company in control of most aspects of production and marketing.

Litter	An absorbent bedding material used in brooding and growing barns.
Live Haul	The hauling of live turkeys to the processing plant.
Macrophage	A cell which can ingest and destroy foreign cells such as bacteria.
Pipped	Fertile hatching eggs at the stage of development when the hatching poult has made a hole in the egg shell.
Poult	Newly hatch turkey.
Producer	Farmer who raises commercial poultry.
Renderer	A company that converts dead animals to usable products by cooking and separation of fat from the protein portion.
Serology	Tests on blood serum to determine the level of circulating antibody to specific disease agents.
Snood	Fleshy appendage falling across and down from the upper beak of the turkey
Tom	Male turkey
Vector	Carrier of a disease agent from one bird to another or even from one farm to another.

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