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Cage and Floor Laying Systems Compared

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CAGE AND FLOOR LAYING SYSTEMS COMPARED

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Cages for laying hens are not new. For the past several years, great numbers of layers have been kept in cages in California and Texas with good results. In these warm semi-arid climates, birds are caged (in out-of-door enclosures) with nothing more than a sun roof to shield them from the heat of the sun. However, in the north central and eastern regions of the United States, it is necessary to build a properly insulated and ventilated house "around the layers" to insure good performance.

The cost of a cage for individual birds, plus an adequate house, has, until recently been relatively high. More recently, the practice of confining two layers to a 10″ wide x 16″ long x 15″ high cage has reduced housing costs in Michigan for the cage system. In many instances cost per bird housed is equivalent for cage and floor systems. In addition, some experimental work has shown lowered housing costs when four birds are confined to each cage. A recent modification for cage operations includes two birds in an 8″ wide x 16″ long x 15″ high cage.

WHICH SYSTEM IS BEST?

Either floor or cage system can be profitable. Both can provide adequate facilities for high annual production, and each system offers its own definite advantages and disadvantages.

Before deciding which system to use, poultrymen or prospective poultrymen should be acquainted with the features and problems peculiar to each system.

Items to be examined include initial cost of house and equipment, type of cage laying equipment (two birds per cage or community cages), labor, availability of automatic equipment, feeding problems, cannibalism, parasite control, manure removal, fly problems, ventilation and insulation, culling, disease control, leg weakness, as well as built-in management features of both cage or floor system. In addition, probable differences in performance for either system should be considered; i.e., number of eggs per bird, egg size, shell and interior quality as well as numbers of broken and checked eggs.

COSTS OF HOUSING AND EQUIPMENT

Housing costs continue to vary from area to area, depending on local conditions, amount of labor provided by the poultryman and number of features demanded such as (complete concrete floor, kind and amount of insulation, electrical features, etc.) However, for comparison purposes, the prices given in (Table 1) represent costs quoted for cage or floor system housing and equipment in lower central Michigan during January, 1962.

Prices of building and equipment are subject to change without notice. Therefore, prices shown in Table 1 may not reflect recent changes or the most improved technology. For example, four birds per cage might reduce house and equipment costs per bird considerably for the cage house. Also, addition of cages above dropping pits in floor houses will reduce these costs for floor-type operations.

Automatic Equipment

Until recently a wide variety of well-designed automatic equipment had not been as available to Michigan poultrymen keeping caged layers as to those with floor birds. Today, however, automatic feeders, waterers, egg gatherers and pit cleaners are equally avail-

Table 1.—Relative Cost of Floor and Cage Layer House Systems

	Michigan Tempered Air Floor Laying House	10-inch Cage (2 Birds per Cage), Aluminum Cage Laying House	8-inch Cage (2 Birds per Cage), Aluminum Cage Laying House
Building & equipment selling price (erected)	$23,469.00	$36,763.00	$24,340.00
Cost per bird housed	$ 4.69	$ 5.98	$ 3.90
Number of birds	5000	6144	6240
Square feet per bird	1.2	0.9	.75
Building size	36' x 180' (6,480 sq. ft.)	31' x 184' (5,704 sq. ft.)	31' x 152'
Type	Pole construction	Cement blocks on concrete footing	Cement blocks on concrete footing
Service room	26' x 12'	21' x 12'	yes
Cooler room	10' x 12'	10' x 12'	yes
Ventilation	forced air-thermostat	forced air-thermostat	forced air-thermostat
Insulation, ceilings, sidewalls	3", 2"	3", 3"	3", 3"
Lighting	time clock controlled	time clock controlled	time clock controlled
Equipment			
Bulk tank	yes	yes	yes
Automatic feeders	yes	yes	yes
Automatic waterers	yes	yes	yes
Automatic gathering belt & sorting table	yes	no	no
Automatic timers	yes	yes	yes
Automatic litter cleaner	yes	no	yes
Cooler compressor	yes	yes	yes
Egg washer	yes	yes	yes
Medicant proportioner	yes	no	no
Water restrictor	no	yes	no

able to both systems. This has lowered the labor requirement for cage houses.

Feeding Problems

No special feeding problem exist for caged layers. Completely automatic feeding systems are available for them. Weigh buggies also provide a semi-automatic method of feeding large flocks in a short period of time. Birds in cages face less competition for feed than do floor layers. For the weak bird or smaller bird, individual feeder and waterer space will allow more feed consumption and thereby increase the individual bird's production. Since overall production for floor-kept flocks is equivalent or greater than that of caged birds, this effect of crowding out weak or small layers is probably not important in a properly-managed floor system.

Manure Removal

Manure should be removed from cage layer houses before fly time in the late spring. Manure cones should be permitted to form before the onset of cold, damp weather since the cones will provide greater surface area for drying than will level manure pits. An automatic manure removal system in conventional or caged houses permits regular cleaning that will prevent build-up of fly population and odor.

Interest is also developing in removing manure by drying, lagooning and composting. Drying, processing and packing poultry manure commercially is costly ($27 to $39 per ton based on Cornell studies). Lagooning on the other hand, presents problems because the reduced light of indoor pits depresses algae growth. With proper sealing of tanks, mechanical oxygenation and adequate depth and volume of water, lagooning has proved effective. Composting is a reliable method of manure disposal, but still involves hauling, rodent and fly problems.

Fly Problems

Flies may be an equally severe problem in a caged layer house or in a conventional house. Under either system of management, untreated wet droppings will serve as a natural place for incubation of fly eggs. A rigid program of spraying with compounds such as Malathion at recommended levels, use of fly tape, treated string, or traps and adequate screening is essential if flies are to be kept at a tolerable minimum. Some poultrymen have used scavenger cockerels under dropping pits to eat fly larva. This has proven effective in some instances, but mortality among such scavengers has proven excessive for the most part.

Ventilation and Insulation

When birds are confined in cages or insulated houses at 1¼ sq. ft. of floor space per bird or less, forced air ventilation is essential for removing moisture and offensive odors. Many cage layer houses in Michigan are constructed without ceilings, but with insulation applied underneath or on top of the roof joists. While this system has proven effective, more positive control of the caged house temperature can be obtained by addition of an insulated ceiling. With this construction feature, the cost per bird housed could be greater for caged layers than for layers housed in conventional houses with ceilings providing tempered air.

Disease Control

Since there is a measure of isolation in cages, disease problems may be less severe in caged layers compared with floor layers. In addition, the alert operator can remove obviously sick birds with greater ease in cages than on the floor. An effective disease control program on either floor or cage system will always require competent diagnosis. Prompt removal of sick or dead birds and immediate disposal by incinerator or adequate pit is essential.

Leg Weakness

Cage layers suffer a greater incidence of leg weakness than do floor layers. The effect (not rickets) may be due to different nutritional requirements of birds deprived of litter and droppings, or may be due, in part, to the effect of prolonged standing on wire. Increased minerals (particularly phosphorus) and fish solubles in the ration for caged layers have been claimed by Texas researchers as an aid in preventing or reducing this leg problem. Convincing evidence is lacking at this time, however. Some cage operators have found that placing a shingle or a piece of cardboard as a standing floor in the cage can help relieve affected birds.

BUILT IN MANAGEMENT FEATURES

1. *Nests.*—Cages provide practical roll-away-type nests at the right height for operator convenience. However, unless nests are dusted regularly, wire marks on eggs may pose a problem. These marks are difficult to remove even with washing.

On the other hand, floor-raised layers have the opportunity to lay on the floor and in out of the way places. Incidence of floor eggs can reach serious proportions unless poultrymen act quickly to discourage this habit. To reduce floor eggs to a minimum, alert operators may resort to placing nests in areas where floor eggs accumulate, or by lowering nests to eliminate darkened floor areas.

2. *Cannibalism.*—Picking occurs to some extent when layers are kept two to the cage, but to a much lesser extent than for many floor flocks.

3. *Medication.*—When it becomes necessary to medicate birds through the feed or water, individual birds, caged one or two to the cage, are more likely to get medication than are those kept under the floor system. This is particularly important for birds that may be in a weakened condition.

4. *Parasite Control.*—Treating for lice and mites in cages poses a problem, since birds must be handled individually to insure effective control. Floor-type layers have the opportunity to dust themselves and so can receive prolonged drug treatment by contact with medication present in the litter.

Table 2.—Results of Egg Laying Tests for Caged or Floor Birds

	Michigan Test 1959-60		Michigan Test 1960-61		12th California Random Sample Test, 1960-61 4th Progress Report		13th California Random Sample Test, 1961-62 3rd Progress Report		2nd New Jersey Random Sample Test, 1959-60		3rd New Jersey Random Sample Test, 1960-61	
	Cages (1 Bird)	Floor	Cages (2 Birds)	Floor	Cages (1 Bird)	Floor	Cages (1 Bird)	Floor	Cages (Colony)	Floor	Cages (Colony)	Floor
Yearly production %	63.70	63.20	61.50	60.50	61.90	68.45	60.30	67.10	66.00	72.00	68.30	75.60
No. eggs per bird (hen-day)	--	--	--	--	208	230	152	170	210	230	224.10	248
Length of test (days)	305	305	305	305	336	336	252	252	350	350	350	350
Mortality %	18.3	16.7	13.50	18.50	6.0	5.1	3.50	3.20	20.10	9.60	9.90	6.20
Feed per dozen eggs (lbs.)	5.10	5.10	4.69	4.98	4.5	--	--	4.20	4.70	4.40	4.61	4.24
Average egg weight (oz./doz.)	26.2	25.30	26.15	24.60	27.1	26.7	26.2	25.30	24.30	24.10	24.80	24.10
Shell thickness (.000-inch) or (mm)*	13.37	12.89	14.08	13.64	.36	0.36	0.34	0.33	15.30	14.60	16.40	16.20
Haugh units	74.5	75.90	78.56	79.72	76.00	73.00	74.00	75.00	81.10	80.30	81.10	79.40
Blood spots (%)	--	--	2.50	1.40	10.5	6.0	7.20	5.10	5.10	3.90	2.11	.95
Meat spots (%)	--	--	--	--	4.4	4.2	3.50	2.60	--	--	--	--
Cracked eggs (%)	--	--	--	--	--	--	--	--	--	--	2.01	.12
Shell defects (%)	--	--	--	--	4.5	1.0	--	--	--	--	--	--

*millimeters

PRODUCTION

The principal purpose of either management system is to provide an environment that will permit good layers to produce high quality eggs at their maximum potential most efficiently. The differences in production and interior quality noted from several Experiment Stations are shown in Table 2. From these results of floor versus cage layers it appears that 1. Eggs laid by cage birds were generally larger and had greater shell thickness than floor birds, and 2. Incidence of blood spots was somewhat higher for cage birds.

SUMMARY

The decision of whether to keep layers in cages or on the floor should be made only after considering all the factors involved. Each poultryman should weigh the advantages and disadvantages of each system (cage or floor) carefully. Only after careful study should a decision be made on which layer management is best for *your* particular poultry enterprise. In any case, the success of either system depends upon the managerial skill of the poultryman.

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