

## Rabbit Production in Selected Urban Areas of Southern Ghana: Status and Implications for Policy and Research

DY Osei<sup>1</sup>\*, SO Apori<sup>2</sup> and ELK Osafo<sup>3</sup>

<sup>1</sup>Animal Research Institute, Council for Scientific and Industrial Research, P.O. Box AH20, Achimota, Ghana

<sup>2</sup>Animal Science Department, School of Agriculture, Cape Coast University, Cape Coast, Ghana

<sup>3</sup>Animal Science Department, College of Agriculture and Renewable Resources, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

\*Corresponding e-mail: doysgh@yahoo.com phone: +233 244 250 741

**Abstract.** A survey was conducted to elicit information on rabbit keeping in 26 urban areas of southern Ghana. The average age of the rabbit keepers was 44.3 years, and 95.5% of the keepers had formal education. Most of the producers got into rabbit keeping for money to meet urgent family needs, while household consumption was a major factor influencing the decision for rearing rabbits. Personal savings was the main source of income for the establishment of the rabbit enterprises. The major breeds of rabbits kept were the California White, New Zealand White and crossbreeds of varied genetic variations. Backyard, small-scale and medium-scale commercial rabbit holdings were held by 18.2, 51.7 and 30.2% of the keepers respectively. The average rabbit population per farm was 77.8, with an average of 8.4 bucks, 21.6 does. Young rabbits formed 70.0% of the rabbit population. Owners of rabbitries usually cared for their animals as hired labour was expensive and often not available. High cost of feed was the most significant constraint to rabbit keeping, and mange was the most common disease affecting the rabbits. Marketing of rabbits was not organized, and this served as a disincentive to expanding the holdings. The rabbits were mostly sold either live or as fresh carcasses at the farm gate. To ensure a rapid growth of the rabbit industry, research should be undertaken to address the identified constraints to production while appropriate policies are put in place to enhance the growth of the industry.

**Keywords:** rabbit keeping, socio-economic characteristics, farming technologies

**Abstrak.** Survei dilakukan untuk mendapat informasi tentang peternakan kelinci di 26 wilayah perkotaan di Ghana selatan. Usia rata-rata peternak kelinci adalah 44,3 tahun dan 95,5% peternak berpendidikan formal. Sebagian besar produsen beternak kelinci untuk mencukupi kebutuhan mendesak keluarga, sedangkan konsumsi rumah tangga adalah faktor utama yang mempengaruhi keputusan beternak kelinci. Tabungan pribadi adalah sumber utama pemasukan untuk mempertahankan peternakan kelinci. Mayoritas kelinci yang dipelihara adalah California White dan New Zeland White dan persilangan berbagai variasi genetik. Sebanyak 18,2% adalah peternak kelinci yang beternak di pekarangan rumah, 51,7% termasuk peternak skala kecil dan 30,2% termasuk skala sedang. Rata-rata populasi kelinci adalah 77,8 dengan rata-rata 8,4 jantan dan 21,6 betina. Sebanyak 70% dari populasi adalah anak kelinci. Pemilik peternakan kelinci biasanya merawat sendiri kelincinya karena tingginya upah buruh dan seringkali tidak ada tenaga buruh. Tingginya biaya pakan adalah hambatan utama beternak kelinci dan kudis adalah penyakit paling umum yang menyerang kelinci. Pemasaran kelinci belum terorganisasi dan ini merupakan pengaruh buruk untuk mengembangkan peternakan. Kelinci biasanya dijual baik hidup maupun bangkai segar di peternakan. Untuk memastikan pertumbuhan cepat industri kelinci, penelitian dibutuhkan untuk menyelesaikan hambatan produksi, sementara kebijakan yang tepat dibuat untuk meningkatkan pertumbuhan industri.

Kata kunci: peternakan kelinci, karakteristik sosio-ekonomi, teknologi peternakan.

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### Introduction

Rabbit, a non-traditional livestock, appears as one of the most suitable means of producing high quality animal protein that could make significant contribution towards bridging the

gap between local production and demand of animal protein in Ghana. This is because of its attributes of affordable low cost management requirements, small body size, short generation interval, high fecundity, rapid growth rate,

ability to utilize forage and agricultural by-products, and adaptability to a wide range of ecological environments (Abu et al., 2008). In many developing countries rabbits are reared purposely to achieve animal protein self-sufficiency for the household. For this reason, it is of low economic importance and its production has remained in the hands of children and small-scale producers. The productivity of rabbit farms in Ghana has remained low for a very long time (Karikari and Asare, 2009) and the rabbit industry lacks behind the poultry and pig industries in development. Nevertheless, rabbit farming has been accepted in the country on the basis of the low production cost and absence of social or religious taboos affecting the consumption of the meat. Furthermore, the diminishing bush-meat supply, and in particular the grasscutter (*Thryonomys swinderianus*), has been a strong impetus to the small-scale rabbit farming (Mamattah, 1978), and more so in the urban areas.

Rabbit production received a major boost in Ghana as a result of a nationwide multimedia communication campaign backing the National Rabbit Project (WRSA, 1979) established in 1972 (Opoku and Lukefahr, 1990) for the promotion of backyard rabbit breeding as a self-help means of increasing meat supplies at low cost (WRSA, 1979). The enthusiasm for rabbit rearing waned when the project ended after a decade of operation despite the increased consumption of rabbit meat and the numerous benefits derived by the rabbit farmers. A number of projects are currently underway aimed at promoting rabbit production in the country, and there is a growing interest among urban dwellers in rabbit keeping for income generation and for home consumption. However, there is inadequate information on domestic rabbit farming to serve as a guide for the successful implementation these projects. This study attempted to assess the status of rabbit

keeping in the urban areas of southern Ghana where rabbit keeping is currently receiving much attention and to suggest recommendations to improve the industry.

## Materials and Methods

**Study area.** The study was undertaken in 26 urban communities in the Greater Accra and Eastern Regions of Ghana in the Coastal Savannah and Deciduous Forest agro-ecological zones respectively. The climatic conditions in the study areas are of the tropical type where average temperatures are usually high with very little variation throughout the year. The mean monthly temperature ranges from 24.0°C in August to 29°C in March with annual average of 26.8°C. The bimodal rainfall pattern in the zones gives rise to major and minor rainy and growing seasons. The first raining season begins in May and ends in mid-July, and the second begins in mid-August and ends in October. The mean annual rainfall is about 800 and 1.500 mm in the Greater Accra and the Eastern Regions respectively. Relative humidity is generally high in the zones varying from 65% in the mid-afternoon to 95% at night. High wind gusts occur with thunderstorm activity along the coastal areas (AMA, 2006; SKC, 2006; SRID, 2009).

**Questionnaire administration and data analysis.** The survey employed structured questionnaire in eliciting information on rabbit keeping, including socio-economic characteristics of the keepers, breeds of rabbits kept, reproduction, types of enterprises, uses of income, sources of farming technologies, housing, diseases, marketing, management and constraints to rabbit farming. The questionnaires were pre-tested with 5 rabbit keepers in each region. Out of the 260 questionnaires administered to the rabbit keepers, 18 respondents improperly filled their questionnaires leaving 242 duly filled questionnaires for analysis. Personal

observation of rabbit keeping and interview of 23 keepers provided additional information for the study. The data collected from respondents were analyzed using the Microsoft Office Excel for percentages and averages.

## Results and Discussion

**Socio-economic characteristics.** Table 1 summarizes the socio-economic characteristics of the rabbit keepers. The average age of 44.7 years of the keepers is lower than that of 47.1 years for producers in Mexico (Mendoza et al., 2008). Mature rabbit keepers, aged between 45 and 54 years formed 27.3% of the keepers. Though some of the 18.6% elderly keepers between the ages of 55 and 64 years may not be active in the industry in the next decade or two, they are likely to pass over their farms to their family members or sell them to others for the continuity of the enterprises. However, the 54.1% young and middle age adult keepers (25 to 44 years old) suggests a bright future for the industry as it is likely that the ageing farmers would be replaced with active keepers, who would be more productive in view of the accumulated experience in rabbit rearing they would have acquired. A large number of the producers (40.1%) had kept rabbits for over 4 years probably as a result of the profitability of the business. About forty six percent (45.9%) had between 3 and 4 years of experience in rabbit keeping, while the rest (14.1%) had been keeping rabbits for less than 3 years. Most of the keepers were married with children. Since most of the owners of the rabbitries were heads of households, the high proportion of male rabbit keepers reflected the dominance of men as heads of households in the communities.

About fifty six percent (55.8%) of the producers had acquired tertiary education and were gainfully employed in either the public or private sectors of the economy but raised rabbits as a secondary occupation. Primary and

secondary levels of education were acquired by 14.1 and 30.2% of the keepers respectively. Post primary level education acquisition by 68.8% keepers was lower than the 78.8% recorded for rabbit keepers in Mexico (Mendoza et al., 2008). Rabbit producer association operating in the study areas, with the primary objective of promoting rabbit meat consumption, attracted less than half of the keepers. This could be attributed to the farmers' perception of the performance of the associations as poor as they were seen as not being effective in meeting the aspirations of the keepers.

**Sources of rabbit farming technologies.** Rabbit farming technologies in husbandry and health care practices, though inappropriate in some cases, were received by 54.6% of the farmers who adopted aspects of the information in the running of their farms. Agricultural extension agents from the Ministry of Food and Agriculture and rabbit farmers associations were the major sources of information to the farmers. Individual experienced farmers were found to be important in the dissemination rabbit technology information as was in the case of the study by Appiah et al. (2009).

**Sources of capital for establishing rabbit enterprises.** The main source of income for the establishment of rabbit enterprises was personal savings of the keepers (Table 3), while a few of them received funds from friends and relations for setting up their rabbitries. The funds received, which often came as gifts or loans without interest, went mainly into the establishment of small scale rabbitries. The high percentage of keepers using personal savings in establishing rabbitries could not commence business on a large scale due to limitation of funds (Olagunju and Sanusi, 2010). They were also not prepared to invest in rabbit farming with commercial loans which attracted high interest rates.

**Reasons for keeping rabbits.** Four main reasons were identified for rearing rabbits (Table 4). The majority of the rabbit keepers got into rabbit farming either for money to meet urgent family needs while a lesser percentage considered rabbit keeping as a major source of income. Only one person, an agriculturist, relied on rabbit keeping as the sole source of income. A few of the keepers took rabbit keeping as a hobby. Though some of the keepers went into rabbit keeping for household consumption, it was a secondary factor influencing the decision for most of them (66.9%) embarking on rabbit keeping.

**Breeds of rabbits.** The crossbred, comprising varied genetic combinations of local and exotic breeds, was the most popular type of rabbit kept by the producers (Table 5), and in particular the smallholder keepers. The crossbred exhibited various hair color including white, brown and black either as a whole or in combinations. California White and New Zealand White breeds were popular among the rabbit keepers as a result of their perceived high growth rate and fertility. A total of 14.9 and 22.7% of the producers kept two and three breeds respectively, while 34.48% kept California Whites in combination with one or

Table 1. Socio-economic characteristics

Characteristics	Average	Percentage
Age (years)	44.7	
Formal education		95.5
Sex: Male		79.3
Married		86.0
Family size	6.0	
Experience in rabbit keeping (years)	3.4	
Membership of rabbit producer association		44.2
Satisfied with the performance of keeper associations		22.7

Table 2. Sources of information on rabbit farming technologies

Source of information	Frequency	Percentage
Agricultural extension agents	101	41.7
Agricultural college graduates	20	8.3
Rabbit farmer associations	71	29.2
Farmers	50	20.8

Table 3. Source of capital for establishing rabbitries

Source of capital	Frequency	Percentage
Personal savings	179	74.0
Friends and relations	41	16.9
Relations	22	9.1

Table 4. Reasons for keeping rabbits

Reason	Frequency	Percentage
Money for urgent needs	146	60.3
Major source of income	40	16.5
Home consumption	22	9.09
Hobby	34	14.1

Table 5. Breeds of rabbits kept

Breeds	Frequency	Percentage
Crossbred	130	53.7
California White	21	8.7
California White, Flemish Giant	16	6.6
California, New Zealand White	5	2.1
California White, Crossbred	5	2.1
New Zealand White, Flemish Giant	10	4.1
California White, Flemish Giant, Crossbred	30	12.4
California White, New Zealand White, Flemish Giant	25	10.3

two other breeds. Other exotic breeds kept in the past included Thuringa, Blue Viennese, Checkered Giant, Lop, Alaska and Yellow Silver (Mamattah, 1978).

**Reproduction.** Most producers (71.9%) did not keep specific bucks for mating but used any available buck that exhibited superior conformation and body weight as sires. Two to 4 bucks were used by 57.0% of the rabbit keepers who kept specific sires, while the rest, who were mainly backyard famers with low doe populations, reserved only one buck for mating. Such keepers, however, resorted to the use of additional bucks when there were 5 or more does available for mating. Young bucks were often selected by keepers from their own flocks for grooming as future sires in conflict with the technical advice rendered by the agricultural extension officers to prevent inbreeding. With the exception of 5 famers all the rabbit keepers sent their breeding does to bucks for mating. Mating occurred mainly in the early morning and evenings as high ambient temperatures were perceived to lower fertility and mating ability of bucks.

Organised mating of rabbits resulting in 3 to 5 kindlings per year with an average of 4 kindlings per year was achieved. This was lower than the average of 5 kindlings per year in the Forest zone of Ghana (Karikari and Asare, 2008). The rest of the keepers mated their does anytime taking into consideration the availability of nursing space. Attempts at achieving 6 kindlings per doe per year tended to result in high kit mortality. Three cases of

double kindling per pregnancy were reported with almost all the kits dying within 2 weeks after birth. Litter size ranged from 1 to 10 with a mean of 4 kits per litter which was lower than the average of 5 kits per litter recorded by the National Rabbit Project (Mamattah, 1978; Opoku and Lukefahr, 1990) and 5 to 8 kits per litter obtained in Nigeria (Abu et al., 2008). The average litter size of 4 kits obtained in the present study was considered low by most of the rabbit keepers. They aimed at achieving higher litter sizes for higher profits through the culling of does producing less than 5 kits per litter. Weaning was undertaken between 4 to 8 weeks after kindling, weaning at 8 weeks after parturition being practiced by over a third of the rabbit keepers. With an average of 4 kindlings per year and 4 kits per liter, a doe would produce 16 kits on the average per year which is lower than 20 marketable offspring per doe obtained in many developing countries (Lukefahr, 2007).

**Rabbit holdings.** None of the rabbit keepers considered his or her rabbitry as a large-scale commercial enterprise. Backyard family, small scale commercial and medium scale commercial holdings constituted 18.2, 51.6 and 30.2% respectively of the rabbit enterprises. Most of the keepers (81.0%) started with backyard farming directed towards home consumption as this enterprise costs little to set up and maintain. Some of them evolved their enterprises into commercial holdings with profit as a motive. The average number of rabbits held by the backyard holdings was 25.3,

while the small-scale and medium-scale commercial holdings held 63.2 and 111.5 rabbits respectively. The rabbit populations in the two categories of holdings were higher than the range of 5 to 15 and 15 to 25 rabbits held by backyard and small-scale farmers in Nigeria respectively where rabbit production is largely traditional, non-commercial and family-consumption oriented (Abu et al., 2008). The average rabbit population per holding was 77.8, with average of 8.4 bucks, 21.6 does and 47.8 young rabbits. This fell within the range of 70 to 100 for commercial rabbit farms in Nigeria (Abu et al., 2008). On the other hand, the average rabbit population on the farms in the present study was lower than the range of 91 to 223 rabbits kept by famers in the forest zone of Ghana ( Karikari and Asare, 2010).

**Uses of income from sale of rabbit.** Seven main uses of income from the sale of rabbits were identified (Table 6) with general household expenses taking the biggest portion of the income, followed by utilities, health care and expansion of holdings. The rabbit keepers who used the income generated mainly for paying school fees operated only backyard and small-scale commercial enterprises.

**Management of rabbits.** Women and children are the mostly involved in the routine management of rabbits in Nigeria (Abu et al., 2008). However, this task was undertaken mainly by men who formed the majority of the owners of the rabbit enterprises in this study (Table 7). Though spouses were not usually directly responsible for caring of rabbits, a few did so with assistance from their children. Hired labour was expensive and not readily available. Nevertheless, some owners of rabbitries relied solely on hired labour for managing the farms. Running of backyard farms was normally undertaken by one person while 2 or 3 persons ran the commercial enterprises.

**Feeds, feeding and watering.** Rabbit production in the study areas was commonly

based on low cost feeding, using locally available feedstuffs. However, over a third of the keepers used poultry feed (Table 8) since commercial rabbit feed and good quality forages were not readily available in the urban localities. The poultry feed, usually mash, was mixed with high fibrous feed, such as wheat bran at a ratio of 1:2. Agro-by products such as wheat bran, maize bran, groundnut haulms, cowpea haulms and residues of tuber crop processing comprised the second most used feed source. The backyard enterprises tended to fall on kitchen scraps comprising vegetables, plantain peels, and tubers in addition to forage in the feeding of rabbits. Such rabbits occasionally developed diarrhoea from consuming stale wastes. Forages fed comprised mainly grasses such as *Panicum maximum* and *Pennisetum purpureum* as well as leguminous plants such as *Cajanus cajan* and *Centrosema pubescens*. Other plants such as sweet potato (*Ipomeas batatas*) leaves and cassava (*Manihot esculenta*) stem and leaves were also used. *Moringa oleifera* leaves and the tender stems have become important as rabbit feed supplements in view of their high nutritional and medicinal properties. Generally, the feed provided to the rabbits was found to be inadequate, qualitatively and quantitatively, and this might have resulted in the substandard growth and reproductive performance of the animals in some of the rabbitries.

Potable water was a major source of water for rabbits (57.9%) followed by bore hole and well water (39.7%). Only a few of the keepers (2.5%) used stored rain to supplement water from other sources for rabbits. Feed and water were provided in clay and concrete pots, and in one case metal pots were used. Though nipple drinkers were found to be effective in dispensing water to the rabbits, only 2.5% of the keepers used the drinkers as they were not readily available and most rabbit keepers lacked knowledge of its use.

**Housing.** Housing constitutes an important factor for a successful rabbit production (Mailafia et al., 2010). Since poor housing could result in the spread of diseases among rabbits and also render management difficult. The rabbit cages were situated mostly at the backyard to enhance accessibility and management and also to prevent theft of rabbits. Where possible the rabbit cages were placed under trees to reduce solar heat. The tree canopies also reduced the exposure of the rabbits to rains and the flow of strong winds which could promote occurrence of pneumonia. Battery cages, comprising 2 or 3 tiers, were commonly used and found to be effective in optimizing space use and collection of droppings. Most of the cages had wooden sides with wire mesh flooring (74.0%) and roofed with metal sheets or felt, while a few keepers used wooden boards or bamboo with openings for the floor. A few solid wooden floors (1.4%) in use rendered the floors unhygienic, and this called for frequent cleaning of the floor which was found to be time consuming and also rendered the floor unhygienic. In the few cases where bamboo strips were used for the flooring the outer surface of the split stems were made to face upwards in order to minimize damage from gnawing and to facilitate cleaning (Owen et al., 2008). Parts of the wooden cages were renewed frequently as a result of gnawing. The cages with metal frame with wire mesh sides and floor (36.0%) though found to be more hygienic and cheaper to maintain were not well patronized in view of the high cost involved in the construction.

**Diseases.** Disease occurrence in the rabbits was quite low (24.8%) and this could be attributed to the good management practices on most of the rabbitries. Mange, a major cause of low productivity in the rabbit industry (Mailafia et al., 2010) and a common disease condition among rabbits in Nigeria (Abu et al., 2008) was

the main disease affecting the rabbits (35.1%). This was followed by coccidiosis and enteritis (25.2%). Sore hocks which occurred on 12.4% of the rabbitries affected mainly the breeding bucks, while ear canker was a problem on 5.8% of the holdings. The other diseases included eye infection and pneumonia. Treatment of sick animals was mainly undertaken by the keepers (80.6%), and in a few cases they relied on either animal health care professionals or experienced farmers for treatment.

**Marketing of rabbits.** Marketing of rabbits was not organized, and as was in the case of farmers in the forest zone in Ghana, rabbits were sold mostly when there was a willing buyer or a strong need for the farmer to raise money (Karikari and Asare, 2008). The majority of the producers (74.8%) sold rabbits, either live, fresh or smoked at the farm gate with 13.2% of them selling rabbits at the market place or shops. The rest of the keepers sold rabbits to processors. Only a few of the keepers (14.5%) smoked rabbits for sale although consumers prefer smoked rabbit probably because it reflects the traditional preparation of game animals (Abu et al., 2008). Smoking of rabbits was limited in view of the tedious nature of the process. Other common traditional methods of processing and preservation of meat such as salting and drying were not practiced probably as a result of the availability of refrigerator in almost all the localities.

**Constraints to rabbit keeping.** High cost of feed was the most significant constraint to rabbit keeping (Table 9) as cheaper feed, in particular forages were not readily available in the urban areas, and where available they were expensive. The commercial feed used by the rabbit keepers was not formulated specifically for rabbits but rather for poultry, and therefore rendered it not ideal for rabbits. Furthermore, the feed was not in the preferred pellet form. Lack of hired labour for cleaning cages, feeding

and watering was a hindrance to the expansion of the rabbitries since most of the owners, who were in other income generating activities, did not have much time for the daily chores of rabbit keeping. Marketing of rabbits was not as organized as in the poultry industry, and was a disincentive to the expansion of commercial holdings. Though disease occurrence was low, specific medicines for rabbits were not

available thus rendering prophylactic and curative measures ineffective in some cases. Though the rabbit keepers did not generally consider lack of technical know-how as a major constraint to production, most of them lacked improved farming practices. Lack of individual identification of rabbits, such as ear tagging militated against good record keeping. Though there were no taboos to the consumption of

Table 6. Producers use of income from rabbit sales

Use of income	Frequency	Percentage
School fees	26	10.7
Utilities/health care	57	23.5
Clothing	6	2.5
Food	24	9.9
Hired labour	23	9.5
General household expenses	76	31.4
Expansion of rabbitry	30	12.4

Table 7. Management of rabbits

Caretaker	Frequency	Percentage
Owner	87	36.0
Spouse	10	4.1
Owner and spouse	47	19.4
Owner and children	48	19.8
Children	20	8.3
Hired labour	30	12.4

Table 8. Feed sources for rabbits

Feed source	Frequency	Percentage
Forage	25	10.3
Kitchen wastes	25	10.3
Agro by-products	56	23.1
Brewers spent grain	7	2.9
Commercial poultry feed	93	38.4
Self prepared feed	10	4.1
Mixture	26	10.7

Table 9. Problems faced by producers in rabbit keeping

Problems	Frequency	Percentage
High cost of feed	83	34.
Lack of good breeding stock	24	9.9
Diseases/Mortality	21	8.7
Lack of hired labour	20	8.3
Lack of technical know-how	7	2.9
Poor marketing	45	18.6
All the indicated problems	42	17.4

rabbit meat in the communities, some people were reluctant to consume rabbit meat as a result of ignorance of the taste and the nutritive quality of the meat. Others also considered rabbits as pets and would therefore not consume the meat. This, however, posed no problem to those who got into rabbit keeping mainly to provide meat for their families.

## Conclusions

The current study identified high cost of feed, poor marketing and lack of good breeding stock as the major challenges facing the development of the rabbit industry in the urban areas of southern Ghana. The high reproductive and nutritive attributes of the rabbit suggests that rabbit production has the potential of contributing significantly to food security and poverty alleviation in the country. There is a need therefore for the adoption of appropriate strategies to improve the performance of the rabbit industry by harnessing the experiences of the young and middle age keepers currently in rabbit farming. It is also important that research be encouraged to address the identified constraints to production while appropriate policies to promote the growth of the industry are put in place. Revitalization of successful past promotional efforts such as that of the National Rabbit Project and adoption of the best production practices would enhance rabbit production in the country. Institutional support for rabbit farming should be provided by the appropriate state agencies and other interested parties, and effective agricultural extension system with adequate capacity to deliver improved farming practices to the rabbit farmers put in place. The formation of producer associations should be encouraged for effective advocacy, formulation and implementation of strategies to ameliorate marketing problems. The farmer associations should also boost

consumption of rabbit meat and expand rabbit market through awareness creation of the good qualities of the meat. Such associations would be in better position than individual keepers in the establishment of effective partnership with service providers, marketing bodies and consumers. Strategies should be developed to enable farmers obtain additional income from lesser known rabbit products such as the skin for the manufacture of high quality leather goods. Encouraging the integration of rabbit production with other farming enterprises, such as vegetable farming and aquaculture, could lead to increased farmer income and sustainability of the rabbit industry.

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