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Measuring Welfare of Egyptian Buffaloes in Different Management Systems

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ABSTRACT

Farms stay environmentally sustainable by mimicking natural processes and ecosystem function. The term "animal well-being" can be understood as avoiding animal abuse and exploitation by maintaining adequate levels of housing, nutrition and public care, prevention and treatment of the disease and ensuring freedom from harassment. 163 dairy buffaloes belonging to 15 farms represent 3 production systems distributed in Menufiya Province were studied to assess its on-farm welfare according to some assessment protocol for Cattle. The systems including faculty farm, traditional farms and commercial farm. 35% of the animals in the Faulty farm had regular body condition score (BCS) versus 48% and 59% in traditional and commercial farms respectively. Very lean buffaloes represent 65 % and 47 % of animals in Faculty and traditional farms, respectively. However no "very lean" animals was found in the commercial farm which represents the majority of "very fat" animals (41%). It should be emphasize that this scoring methods are not suitable for buffaloes under Egyptian condition. Faculty farm animals lied down within 11 sec. however, time needed to lie down were 9 and 6 sec. in traditional and commercial farm respectively. When animals were laid down 40%, 8% and 25% of them collided with housing equipment in Faculty, traditional and commercial farms respectively. According to body cleanliness, Faculty farm had higher values of cleanness (65 %, 60 % and 70) in lower hind legs, hind quarters and udder respectively, due to concrete bedding available. However the muddy buffalo skin considered positively for the animals. Loose housing animals in commercial farm be have normal than the tied animals in the other systems. However traditional systems allow animals to move to field daily with axes to pasture available. Animals in Faculty farm system did not have any opportunity to move outdoor and/or to pasture. The percentages of severely lame animals were very slight in general (10%, 0% and 5%) for Faculty farm, traditional farm and commercial farm respectively. It is remarkable that pathological conditions affecting buffaloes feet are rare thus using lameness score to assessing buffalo welfare could be unsuitable. The percentages of animals with severe integument alterations was highest in Faculty farm (40 %) where concrete bidding was constructed and the lowest in traditional farm where animals move to field daily (12 %). Commercial farm had intermediate mean value of 21 % integument alterations. Displacements and head butts as an indication of animal's agonistic behaviour were elevated in commercial farm with free barn stalls (3.00 and 1.70 respectively). However agonistic behaviour was lower in Faculty farm (1.38 and 0.87 respectively) and traditional farm (1.24 and 0.75 respectively) with tie stalls.All investigated disease had lower values than that illustrated by the Welfare Quality® Assessment Protocol for Cattle (2009) for warning threshold in the three studied farms. This may be due to high immunity level of Egyptian buffaloes than cows.

Keywords: Measuring welfare, Egyptian buffalo, animal behaviour, Production systems

INTRODUCTION

The use of mechanization and modern techniques (intensive production) greatly increased production efficiency.Consequently cattle are susceptible to a variety of stress factors (rough handling, poor housing conditions). The public concern about animal welfare in farm animals has grown during the last 20 years. The welfare of an animal has been defined by Fraser and Broom (1990) as its state at it seeks to cope with its environment. Welfare principally concerns both the physical and psychological well-being of an animal, which is largely determined by the standard of stockman ship, the system of husbandry and the suitability of the animal for the environment (FAWC, 2009).

The concept of quality currently includes the effects of production systems on the environment and animal welfare, which are reflected in human health.

The development of agriculture around the world has raised new aspects, including animal welfare.

Measures of welfare are needed to give producers and consumers the information they need to evaluate management practices and determine which techniques best assure the welfare of animals used for food production. Therefore development of scientific measures of welfare and an enhanced ability to interpret such measures is crucial importance to the evaluation of current agriculture.

At present, some monitoring systems have been developed in Europe for assessing welfare at farm level. For example TGI35L in Austria (Bartussek, 2001) and TGI200 in Germany (Sundrum, 2001).

Buffalo husbandry is a characteristic of depressed areas and has been carried out for centuries with extensive breeding systems in low swamps. The increased production of buffalo milk has attracted considerable attention to this species. However, the intensification of buffalo breeding has exposed its environment to a rapid change, imposing physical and psychological stressors not yet known on this species. Several studies have examined the impact of environmental factors and management on cattle welfare (such as handling, loading and noise, space restriction, locomotion limitation, isolation and shipping (Agnes *et al.,*1990, Maton and Daelemans, 1989). The effect of stress on productive performance and the welfare of buffaloes is Less known (Hussein *et al.,* 1997; Kanchev *et al.,* 1997).

There is a need to develop a monitoring system to assess the welfare of buffaloes on farms either to provide a certification system to compare different breeding systems and / or as a management tool for farmers. Unfortunately, studies on this issue are few. Recently, some animal-based parameters have been assessed and can be used to assess the welfare of buffalo at the farm level (De Rosa *et al*., 2003 and Leeb *et al.,* 2004). According to Dawkins *et al.* (2004), design variables alone are not a good predictor of animal welfare and the assessment should be based on animal measures, as they are the results of the interaction between the animals and the environment .

When assessing social welfare, behavioral measures are of particular value (Elkaschab *et al*., 2017 and Wiepkema, 1983).

Therefore, the main objective of this study was to measure the welfare of buffalo under Egyptian conditions

using multiple standards and integrated models that have been used extensively in recent decades in many fields of life sciences, but the scope of their use in animal welfare is comparatively poor.

MATERIALS AND METHODS

This experiment was performed to evaluate the current level of welfare of Egyptian buffaloes under different production systems using a specific modified method of that described in the Welfare Quality ® Assessment Protocol for Cattle (2009). The measures had been included in a survey sheet. Surveys were conducted during March, April and May 2015.

Management system

Welfare assessment was performed on 163 animals belonging to 15 Egyptian dairy buffalo farms representing three production systems distributed as following:

Traditional farm systems:

containing 25 animals in their first to sixth lactation distributed in 13 farms in Menufia Province. The majority of Egyptian buffalos are kept on this system in which farm contains one to three heads only. Animals are housed tie-stall in closed and primitive barns, in the evening. Early morning, animals were taken to spend the day time in field semi-shelter and/or primitive barns (Figure1). Animals were feed an Egyptian clover (Trifolium alexandrinum) and/or available concentrate mixture, during the period from November through May, while they were fed clover hay, available concentrate or concentrate mixture and wheat straw during the rest of the year. Roughage was presented twice daily at the feed manger. Water was produced to animals three times a day on concrete trough. Concentrate was delivered during milking times. Milking was performed manually twice daily in the stall.

Faculty farm system

Containing 18 animals in their first to nine lactations housed in the research unit for animal behaviour, belonging to the faculty of agriculture, Minufiya University, Shebin El-kom, Egypt. This farm unit representing the main production systems in the majority of governmental farms in Egypt which implements government financial laws and regulations. Milk production level in this Unit reach an average of 2000 ± 300 kg/lactation period which represents the average of milk yield in Egyptian buffaloes (El kaschab,1998). Animals were housed in tie-stall barn measured 1.2 × 1.7 m. with hard surface (Figure 2). The lighting was adequate to monitoring the animals at the day while industrial dim lighting was used at night. Farm was constructed to be vertical on the wind direction, north, in order to provide good ventilation. Further, farm is provided with 45 degree-angled opening windows and six extractors and fans to maintain healthy ventilation system (Figure 3). Animals were feed an Egyptian clover (Trifolium alexandrinum), concentrate mixture and rice straw during the period from December to May, while they fed clover hay, concentrate mixture and rice straw during the rest of the year. Concentrate mixture was offered according to their maintenance and productive requirements (NRC (1985). Roughage was presented twice daily (10 am and 4 pm) at the feed manger. Water was available ad lib from automatic drinkers. Concentrate mixture was delivered during milking times. Machine milking was performed twice daily (at 5 am and 5 pm) using portable, milking machine (Figure 4).

Fig.1: Field housing system during the day

Fig.2: Individual tie-stall barn in the faculty farm

Fig. 3: 45° angled opening windows and extractors in the Faculty Farm

Fig.4 : milking using portable milking machine

Commercial farm system:

Named as "El-koumy farm", represent intensive production systems in Egypt and specialized in buffalo milk containing 110 animals in their first to six lactations with an average of 2800 kg milk yield per lactation. This Farm located in Elbeheera province, Nubaria, El-shagaha village on the desert road (Cairo – Alexandria, Egypt) at 90 km, from Alexandria. The animals were kept in loose housing system in open, half-shaded pens with periodically replaced sandy ground (Fig.5). The animals were fed using total mixed ration (TMR) for ad-libitum intake. The diet consists of the clover, silage, clover hay, corn, soybean meal, wheat barn, minerals and vitamins. Machine milking was performed in a constant milking parlor (Fig.6). Assessing was performed by using modification to the specific method described in the Welfare Quality® Assessment Protocol for Cattle (2009). The measures had been included in a survey sheet. Surveys were conducted during March, April and May 2015.

Fig.5: half-shaded pens in commercial farm

Fig.6 : Milking parlor in commercial farm

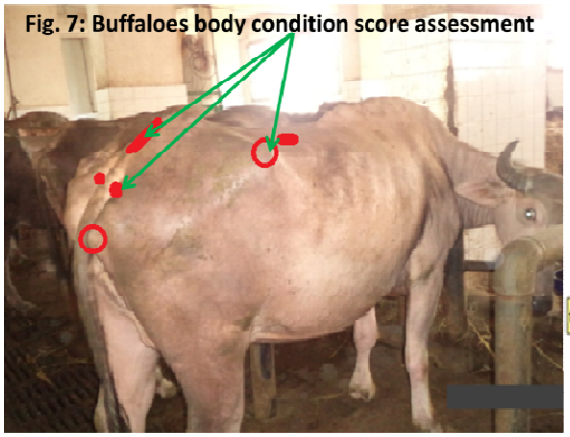

Fig. 7: Buffaloes body condition score assessment

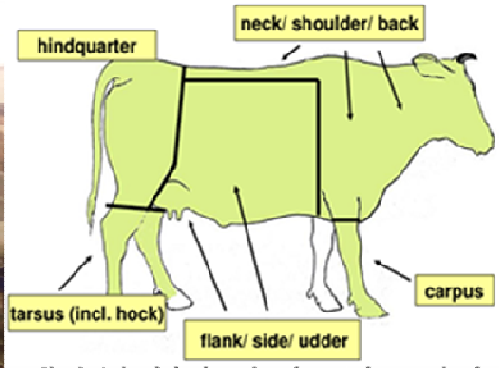

Fig. 8: Animals body regions have to be examined with regard to integumentary alterations

Criteria studied:

There are 12 criteria in animal welfare science that should be adequately covered when evaluating assessment systems. It was decided to focus on aspects of the actual welfare of animals, such as their behavior, fear, health or physical condition. The Welfare Quality® Assessment Protocol for Cattle utilized management, physiological, health and behavioural characteristics as shown in Table (1,2 and 3).

Table 1. Studied criteria of Welfare Quality® Assessment Protocol for Cattle

Welfare assessment	Welfare Criteria	Measures
Good feeding	Absence of prolonged hunger	Body condition score
	Absence of prolonged thirst	Water provision, cleanliness of water points, functioning of water points
Good Housing	Comfort around resting	Time needed to lie down, animals colliding with housing equipment during lying down, cleanliness of udders, cleanliness of flank/upper legs, cleanliness of lower legs
	Ease of movement	Presence of tethering, access to outdoor loafing area or pasture
Good health	Absence of injuries	Lameness, integument alternations
	Absence of disease	Coughing, nasal discharge, ocular discharge, hampered respiration, diarrhoea, vulvar discharge, mortality, dystocia, downer cows
	Absence of pain induced by management procedures	Disbudding/dehorning, tail docking
Appropriate Behaviour	Expression of social behaviours	Agonistic behaviours
	Expression of other behaviours	Access to pasture

Table 2. Animals' body condition scoring

	Body Region	Very lean	Very fat
1.	Cavity around tail head	Deep cavity around tail head	Tail head cavity full and folds of fatty tissue present
2.	Loin	Deep depression between backbone and hipbones (tuber coxae)	Convex between backbone and hipbones (tuber coxae)
3.	Vertebrae	Ends of transverse processes sharp	Transverse processes not discernible
4.	Tail head, hipbones, spine and ribs	Tail head, hipbones (tuber coxae), spine and ribs prominent	Outlines of fat patches visible under skin

Table 3. Warning and Alarm threshold for each disease symptom

Symptom	Warning threshold	Alarm threshold
Nasal discharge (% of cow)	5	10
Ocular discharge (% of cow)	3	6
Frequency of coughing per cow per 15 min.	3	6
Hamperes respiration (% of cow)	3.25	6.5
Diarrea (% of cow)	3.25	6.5
Vulva discharge (% of cow)	2.25	4.5
Dystocia (%)	2.75	5.5
Downer cows (%)	2.75	5.5
Mortality (%)	2.25	4.5

Statistical analysis:

Statistical analyses were conducted using SPSS program (1999).

RESULTS AND DISCUSSION

Twelve criteria have been identified in the assessment systems and emphasis has been placed on so-called animal-based measures address the real welfare state of animals in terms of, for example,
their behavior, fear, health or physical condition.

Good feeding

Feeding provides the necessary energy to sustain bodily functions and good production (Ferguson *et al.,* 1994). De Rosa *et al.*, (2009) reported that B. C. S is used in buffaloes as well as in cattle to estimate the energy balance. As it may be ascertained from Table (4) and Figure (9), 35% of animals from Farm I had regular BCS versus 48% in farm II and 59% in farm III. Very lean buffaloes represent 65 % and 47 % of animals in Farm I and farm II respectively. However there is no very lean animals in farm III. The majority of very fat animals were found in farm III (41%).

This condition can be explained by quality of feed and housing systems. Furthermore, the cause may be due to the differences in physical activities as well as the quality of feed and pasture (Fregonesi and Leaver, 2001). However, (Campanile *et al.,* 1998a) concluded that morphologically, buffalo is more resembling beef cattle than dairy cattle.

Scoring body condition as illustrated by the Welfare Quality® Assessment Protocol for Cattle (2009) are not suitable with buffaloes under Egyptian condition that don't interest about stage of lactation and the Egyptian buffalo is more resembling beef cattle than dairy cattle.

All systems had acceptable water provision sources which were partly dirty bowl working correctly in Farm I versus partly dirty trough working correctly in farms II and clean trough working correctly in farm III. In spite of Water must be supplied with high quality and dirty water should be avoided which may limit water consumption. De Rosa *et al.,* (2009) noted that efficiency rating of water provision would be too time-consuming to record. Elkaschab (1998) reported that a long period of thirst could be affecting milk production in dairy animals.

Very lean Regular Very fat

Fig. (9): Body Condition Scoring (BCS) of Egyptian buffalo

Table 4. Good feeding criteria in different production systems.

Welfare Criteria	Welfare measure		Faculty farm (I)	Traditional farms(II)	Commercial farm(III)
Absence of prolonged hunger	Body condition score (BCS)	Regular %	35	48	59
		Very lean %	65	47	0
		Very fat %	0	5	41
Absence of prolonged thirst	type of the water points		bowl	Trough	Trough
	Cleanliness of water points		Partly dirty	Partly dirty	Clean
	Functioning of water points		Working correctly	working correctly	Working correctly

Good housing

The welfare of farm animals is not simply limited to the animal's functioning and performance. They should also be able to develop normally and to express species specific behaviours in order to adapt to the environment in relation to their innate natures. The provision of barren housing systems irrespective of the animals' natural behaviour and needs may reduce the welfare of livestock such as buffaloes, which have been subjected to intensive farming in recent years De Rosa *et al*., (2009).

In cattle, the risk of falling and colliding animals may become more dangerous because there is no adequate housing system and it may reduce the ease of changing the animal's position from lying down to standing. Therefore, The time to lie down and the proportion of animals that collided with barn corridors while lying down were recorded. (Winckler *et al.,* 2003).

Table (5) illustrates Good housing criteria (comfort around resting and ease of movement) in different production systems. Animals in farm I lied down within 11 sec. on the other hand time needed to lie down were 9 and 6 sec. in farm II and III respectively. Elevating of time needed to lie down in production system I may be due to slippery bedding (concrete bedding). The Welfare Quality® Assessment Protocol for Cattle (2009) stated that the normal time needed for cattle to lie down is ≤5.20 s, however >5.20 s.-≤6.30 s. could be a moderate problem. If the time for lie down exceeded 6.30 s. it could be evaluated as sever problem for the animals. In general levating of time needed to lie down in the present study may be due to the nature of Egyptian buffaloes as a lazy animal.

De Rosa *et al*., (2009) noted that The intensification of farming systems has adversely affected the buffalo's welfare aspects. As it may be ascertained from table (5) animals percentage colliding with housing equipment during lying down were 40, 8 and 25 % for farm I, II and III respectively.

Cleanliness of udder, flank upper legs and lower legs had higher values in farm I (65, 60 and 70 % clean of lower hind legs, hind quarters and udder res.) which due to easy clean of concrete bedding available, Table (5).

Animals were tied in systems I and II however they housed loose in fresh air stalls in system III. On the other hand buffaloes in farm II were pasturing with tether 300 days/year. Keeling and Veissier, 2005 reported that the lack of free movement and pasturing may be evaluated as extremely bad, since the lack of time that cows spend in fresh air and pasturing endangers their health, conception and welfare.

Table 5. Good housing criteria in different production systems

Welfare Criteria	Welfare measure		Faculty farm	Traditional farms	Commercial farm
Comfort around resting	Time needed to lie down (sec.)		11	9	6
	% Animals colliding with housing equipment during lying down		40	8	25
	Body Cleanliness in %	Lower hind legs	65	45	52
		Hind quarters	60	47	50
		udder	70	45	45
Ease of movement	Presence of tethering		Tie stall	Tie stall	Loose housing
	Access to outdoor loafing area or pasture	days with access to pasture per year	0	300	0
		Days with loafing area	0	0	365

The strange buffalo wallowing behaviour aimed to protect its skin from solar radiation and parasites. Therefore, the presence of mud on the buffalo skin is considered positive, but the presence of thick and compact layer of manure on buffalo skin may reflect a low level of cleanliness Therefore, the method developed for cattle should be modified. De Rosa *et al*., (2009).

Good health

The major problem in dairy cattle welfare is Lameness, where their presence is usually associated with pain and discomfort (De Rosa *et al.,* 2009). This may be caused by several different causes, such as unbalanced nutrition, flooring, social behaviour and related time spent standing, etc. (Galindo *et al*., 2000; Winckler and Willen, 2001).

The percentage of not lame animals and severely lame animals were estimated to declare health status of studied animals. Table (6) shows that, % of severely lame animals were very slight (10, 0 and 5 % for farm 1, 2 and 3 resp.). The lower percentage of not lame animals and severely lame animals (0,0%) belonging to traditional farms could be due to that animals almost walking long distances daily to the pasture places. The quality of floors, in terms of shape, hardness, friction and hygiene is of great importance for the health of cow feet and legs (El Kaschab *et al*., 2009a).

An ideal floor must be hygienic, comfortable to walk on and have an even, slip-resistant surface without being too abrasive. The floors must be simple to construct, durable, easy to manage and maintain. Concrete has long been the most common material for floors in confined animal systems, but a softer and more resilient material like rubber might be a future alternative (El Kaschab *et al*., 2009b).

It seems that the use of modified mastic asphalt is very promising but its sensitivity to heat leads to the release of stones (which are part of the asphalt) , which leads to increased lameness and hoof problems.

In the meantime, it should facilitate the movement of cattle and reduce the excessive involuntary standing and walking on concrete floors. And here we have to thinking about animals habituation which could be changing the behavioural reaction after a while. Habituation is an extremely simple form of learning, in which an animal, after a period of exposure to a stimulus, stops responding. The most interesting thing about habituation is that it can occur at different levels in the nervous system (El kaschab,2009c).

Napolitano *et al*., 2005 conducted a study on 3 buffalo farms and noted that lameness was virtually absent since pathological conditions affecting the feet of buffaloes are rare (Cammarano and Marino, 2003). thus using lameness score to assessing buffalo welfare unsuitable.

The presence of skin lesions and swelling on the animal is the result of the impact of the surrounding environment on the animal's body such as hard floors. De Rosa *et al*., (2009). % animals with severe integument alterations was highest in farm I (40 %) and the lowest in farm II (12 %), on the other hand farm III had intermediate mean value (21 %). The highest value of animals with severe integument alterations in farm I may be due to hard floor and farm obstacles.

Leeb *et al.*, (2004) recording any hair-free areas, thinning layer (larger of 2 cm) due to the presence of parasites, swelling and lesions (wounds and scabs) and callosity in body,s areas This assessment can also be used in buffalo, taking hair-free areas into consideration.

Egyptian buffalo is almost bald animal thus using hairless patches score to assessing buffalo welfare is unsuitable. In this point we need more studied to declare correlation between buffalo skin color, pigment concentration, and animal welfare.

The disease and mortality of buffaloes is a problem in terms of welfare and economic loss. Culling rate due to mortality, disease, and accidents should be take into account, De Rosa *et al*., (2009).

The symptoms of the disease are compared with warning and warning thresholds. Where it is considered the minimum value when developing a health plan for the farm. The warning threshold is half the alarm threshold (Table 6) according to the Welfare Quality® Assessment Protocol for Cattle (2009).

All investigated disease had lower values than that illustrated by the Welfare Quality® Assessment Protocol for Cattle (2009) for warning threshold in the three studied farms. This may be due to high immunity level of Egyptian buffaloes against cows. Thus using illness score to assessing buffalo welfare needs more investigation.

Table 6. Good health criteria in different production systems

Welfare Criteria	Welfare measure		Faculty farm	Traditional farms	Commercial farm
Absence of injuries	Lameness	% not lame animals	90	100	95
		% severely lame animals	10	0	5
	Integument alterations	% animals without integument alteration	35	53	49
		% animals with mild integument alterations	25	35	30
		% animals with severe integument alterations	40	12	21
Absence of disease	Coughing	No. coughing animals/15 min.	1.3	0.6	0.8
	Nasal discharge	% animals with nasal discharge	0	1.3	2
	Ocular discharge	% animals with Ocular discharge	1.6	1	1.1
	Hampered respiration	% animals with hampered respiration	1.75	1.25	0.8
	Diarrhea	% animals with Diarrhoea	0	0.8	1
	vulvar discharge	% animals with vulvar discharge	2.00	1.30	1.36
	Mortality	% dead animals during the last year	2.26	2	1.42
	Dystocia	% of Dystocia	2.25	2	1.5
	Downer cows	% of Downer cows	0	0	0
Absence of pain induced by management procedures	Disbudding/dehorning		0	0	0
	Tail docking		0	0	0

Disbudding, dehorning and tail docking represent extra pain induced by management procedures which have negative effect on animal welfare. These procedures didn't apply in Egypt and should be eliminated from scoring buffalo welfare.

Appropriate behaviour

Appropriate behaviour criteria in different production systems studied were shown in Table (7). It is obvious that Displacements and head butts as an indication of agonistic behaviour were elevated in farm 3 with free barn stalls (3.00 and 1.70 resp.) however these agonistic behaviour were lower in farm I (1.38 and 0.87 resp.) and farm II (1.24 and 0.75 resp.) with tie stalls.

The Welfare Quality® Assessment Protocol for Cattle (2009) mentioned that According to studies conducted in this regard, an average of 5 agonistic encounters per cow per hour is the absolute maximum expected, including 3.4 displacements and 1.6 head butts. Inadequate housing and feeding expose animals to numerous stressors and unpleasant emotions, which all affect the occurrence of diseases, injuries and behavioural disorders Vučemilo *et al*., (2012).

Table 7. Appropriate behaviour criteria in different production systems

Welfare Criteria	Welfare measure		Faculty farm	Traditional farms	Commercial farm
Expression of social Behaviours	Agonistic behaviours	Displacements (per cow per hour)	1.38	1.24	3
		head butts (per cow per hour)	0.87	0.75	1.7

This protocol did not care about the effect of tethering on animal behaviour, especially agonistic behaviour. Therefore, the method should be modified taking into account whether the animals are tied or loosed.

CONCLUSION

The Welfare Quality® Assessment Protocol for Cattle (2009) mainly used in this study to declare the ability to use with Egyptian buffaloes under local conditions to assess its welfare. Results of the present study revealed that unsuitable using previous protocol to assess Egyptian buffalo welfare. Buffaloes are more similar to beef cattle than dairy cows therefore needs an special Body condition score which considers the performance of Buffaloes conformation. Buffaloes wallowing aimed to

gain protection against solar radiation and dermal parasites which is a species specific behaviour.

Therefore, some may consider that presence of mud on buffalo skin is positive. All investigated disease in the present study had had lower values than that illustrated by this Protocol for warning threshold. This due to high immunity level of Egyptian buffaloes against cows. Thus using illness score to assessing buffalo welfare needs more investigation. Egyptian buffalo is bald animal thus using hairless patches score to assessing buffalo welfare should be reconsidered. In addition, to assess animals welfare, the data will be integrated into one comprehensive assessment of animal welfare using MULTIPLE BEHAVIORAL CRITERIA methods developed by Elkaschab *et. al.* (2017) for buffaloes under Egyptian condistion.

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قياس سبل الراحة فى الجاموس المصرى تحت نظم رعاية مختلفه

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تبقى المزارع مستدامة بيئيا عن طريق محاكاة العمليات الطبيعية والنظام البيئي. ويجب تجنب الإساءة للحيوانات واستغلالها من قبل البشر عن طريق توفير مستويات مناسبة لها من السكن والتغذية والرعاية العامة والوقاية والعلاج من المرض وضمان التحرر من المضايقة ، وعدم الشعور بعدم الراحة والألم والتى يمكن فهمها كمرادف لـ "رفاهية الحيوانات". تم دراسة ١٦٣ جاموسه حلابة تنتمي إلى ١٥ مزرعة وتمثل ٣ أنظمة إنتاجية موزعة على محافظة المنوفية لتقييم مستوى رفاهيتها في المزرعة وفقا لبعض بروتوكولات تقييم الماشية. كانت النظم الانتاجيه المدروسه هى مزرعة الكلية والمزارع التقليدية والمزارع التجارية. كانت الحاله الجسمانيه(BCS) معتدله لحوالى ٣٥٪ من الحيوانات في مزرعة الكليه مقابل ٤٨٪ و ٥٩٪ في المزارع التقليدية والتجارية على التوالي. الجواميس الهزيلة جدا كانت تمثل ٦٥ ٪ و ٤٧ ٪ من الحيوانات في مزرعة لكليه والمزارع التقليدية ، على التوالي. ومع ذلك ، لم يتم العثور على حيوانات "نحيفة للغاية" في المزرعة التجارية التي تمثل أغلبية الحيوانات "شديدة السمنه" (٤١٪). يجب التأكيد على أن طرق التقييم هذه ليست مناسبة للجاموس تحت الظروف المصرية. استغرقت حيوانات مزرعة الكليه حوالي ١١ ثانية فقط للرقاد على الأرض ولكن، كان الوقت اللازم للرقاد ٩ و ٦ ثواني في المزارع التقليدية والتجارية على التوالي. ٤٠ ٪ ، ٨ ٪ و ٢٥ ٪ من الحيوانات كانت تتصادم مع معدات السكن أثناء الرقاد في مزرعة الكلية ، والمزارع التقليدية والتجارية على التوالي. ووفقًا لنظافة الجسم ، تمتعت مزرعة الكلية بقيم أعلى من النظافة (٦٥٪ ، ٦٠٪ و ٧٠) في الساقين الخلفيتين السفليتين ، الأرباع الخلفية والضرع على التوالي ، بسبب توافر الأرضية الخرسانية. ومع ذلك يمكن اعتبار وجود الطين على جلد الجاموس شئ إيجابي للحيوانات. كانت الحيوانات الطليقه في المزارع التجارية طبيعية بصورة اكبر من الحيوانات المربوطة في النظم الأخرى. حيث تسمح الأنظمة التقليدية للحيوانات بالانتقال إلى الحقل يومياً إلى المراعي المتاحة. لم يكن لدى الحيوانات في مزرعة الكلية أي فرصة للتحرك في الهواء الطلق و / أو إلى المراعي. كانت النسب المئوية للحيوانات المصابة بالعرج الشديد طفيفة بوجه عام (١٠٪ ، ٠٪ و ٥٪) لمزرعة الكلية والمزرعة التقليدية والمزرعة التجارية على التوالي. من اللافت للنظر أن المؤثرات المرضية التي تؤثر على قدم الجواميس نادرة ، وبالتالي فإن استخدام نقاط العرج لتقييم رفاهية الجاموس قد يكون غير مناسبه. كانت النسب المئوية للحيوانات ذات التغيرات الحادة في شكل الجلد هي الأعلى في مزرعة الكلية (٤٠٪) حيث الأرضية الخرسانية وأقلها في المزارع التقليدية حيث تنتقل الحيوانات إلى الحقل يومياً (١٢٪). المزارع التجارية لديها قيمة وسطية بنسبة ٢١ ٪ من الحيوانات ذات التغيرات الحادة في شكل الجلد. تعاظم تغيير الحيوان لمكان وقوفه وضرب الرأس كمؤشر لسلوك الحيوان العدائي في المزارع التجارية حيث الحظائر المفتوحه (٣.٠٠ و ١.٧٠ على التوالي). بينما كان أقل في مزرعة الكلية (١.٣٨ و ٠.٨٧ على التوالي) والمزارع التقليدية (١.٢٤ و ٠.٧٥ على التوالي) حيث الحظائر ذات المرابط.كانت نسبة جميع الأمراض التي تم فحصها أقل من تلك التي أوضحها بروتوكول تقييم جودة الرعاية والرفاهية للماشية (٢٠٠٩) لتوخى الحذر في المزارع الثلاثة المدروسة وقد يكون هذا بسبب ارتفاع مستوى مناعة الجاموس المصري عن الأبقار.

الكلمات الإسترشاديه: قياس الرفاهية ، الجاموس المصري ، سلوك الحيوان ، نظم الإنتاج