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Editorial

Intergovernmental meeting

The Seventh Session of the Intergovernmental Technical Working Group on Animal Genetic Resources for Food and Agriculture took place in Rome in October 2012.¹ As discussed in the editorial of volume 51, one of the main tasks facing the Working Group was to review progress made in the implementation of the Global Plan of Action for Animal Genetic Resources². The Working Group welcomed the substantial progress made, but acknowledged that gaps remain to be addressed, particularly in terms of improving collaboration and the funding of activities. Detailed information can be found in the document *Synthesis progress report on the implementation of the Global Plan of Action for Animal Genetic Resources – 2012*,³ which was prepared for the Working Group's meeting.

The information presented in the *Synthesis progress-report* was also used to prepare a set of three posters:

1. Strategic priorities of the Global Plan of Action for Animal Genetic Resources⁴
(overview of the strategic priorities of the Global Plan of Action at national, regional and global levels);
2. Status of implementation of the Global Plan of Action for Animal Genetic Resources⁵
(indicators for each strategic priority at national, regional and world levels); and
3. Colour scheme expressing levels of implementation of the Global Plan of Action for Animal Genetic Resources⁶
(colour scheme used to illustrate the indicators).

The Working Group's agenda also included the preparation and timing of an update of *The State of the World's Animal Genetic Resources for Food and Agriculture*. It had been foreseen that a second report would be presented to the Commission on Genetic Resources for Food and Agriculture in 2017, 10 years after the first report was published. However, because of the heavy workload scheduled for the Commission's Sixteenth Regular Session in 2017, the Working Group was asked to consider the possibility of advancing the preparation of the second report by two years, i.e. recommending that the Commission request FAO to present the

report to the Commission's Fifteenth Regular Session in 2015, which would mean having a draft ready for review by the Working Group in late 2014. The Working Group recommended that the Commission agree to this schedule. This volume of *Animal Genetic Resources* went to press before the Commission's meeting in April at which the Working Group's recommendation was to be considered.

The second report, whether presented in 2015 or later, would be regarded very much as an update of the first report, presenting the changes that have occurred during the intervening years in the status of animal genetic resources and their management, as well as the latest scientific developments in relevant fields. Reporting burdens placed on countries would be kept to a minimum and information on the state of animal genetic resources management at national level obtained via specific questionnaires rather than by requesting more elaborate country reports of the type prepared for the first report.

The Working Group's agenda also included a review of implementation of the Funding Strategy for the Implementation of the Global Plan of Action for Animal Genetic Resources (the meeting coincided with the announcement of the first set of projects chosen to receive support under the Funding Strategy);⁷ the roles of small-scale livestock keepers in the conservation and sustainable use of animal genetic resources; targets and indicators for animal genetic resources; the status and trends of micro-organisms for ruminant digestion; and a review of the outcomes of the First Session of the Commission's Working Group on Access and Benefit Sharing.

Thirty years of the Commission

As well as being a potentially busy year for the international animal genetic resources community, 2013 is also the thirtieth anniversary year of the Commission. Founded in 1983 as the Commission on Plant Genetic Resources for Food and Agriculture, the Commission can look back on a long series of achievements, including the negotiation of the International Treaty on Plant Genetic Resources for Food and Agriculture and the preparation of State of the World Reports and Global Plans of Action in the plant and animal genetic resources sectors. The Commission's work has expanded from its initial focus on crops, first to animals (livestock) and later to forests, aquatic genetic resources, and invertebrates and micro-

¹ <http://www.fao.org/docrep/meeting/026/mf227e.pdf>

² www.fao.org/docrep/010/a1404e/a1404e00.htm

³ <http://www.fao.org/docrep/meeting/026/mc636e.pdf>

⁴ <ftp://DADnet:Mobile45@ext-ftp.fao.org/ag/reserved/dad-net/GPA.pdf>

⁵ <ftp://DADnet:Mobile45@ext-ftp.fao.org/ag/reserved/dad-net/Indicator.pdf>

⁶ ftp://DADnet:Mobile45@ext-ftp.fao.org/ag/reserved/dad-net/Traffic_light.pdf

⁷ http://www.fao.org/ag/againfo/programmes/en/genetics/Funding_strategy.html

organisms. Links between the various sectors of genetic resources and their roles in the provision of ecosystem services are receiving ever greater attention in the Commission's work, particularly in light of the planned preparation of a report on *The State of Biodiversity for Food and Agriculture*.

Journal archive

Readers may be interested to learn that Cambridge University Press has made all back issues of *Animal Genetic Resources* available on its web site,⁸ which also features a powerful search tool.

⁸ <http://journals.cambridge.org/action/displayBackIssues?jid=AGR>

Éditorial

Rencontre intergouvernementale

La Septième Réunion du Groupe de Travail Technique Intergouvernemental sur les Ressources Zoogénétiques pour l'Alimentation et l'Agriculture s'est tenue à Rome en Octobre 2012.¹ Comme il a été dit dans l'éditorial du volume 51, une des principales tâches que le Groupe de Travail a dû confronter a été celle d'examiner les progrès réalisés dans la mise en œuvre du Plan d'Action Mondial pour les Ressources Zoogénétiques.² Le Groupe de Travail a fait bon accueil au substantiel progrès réalisé, en admettant cependant qu'il existe encore des lacunes à combler, notamment en ce qui concerne l'amélioration de la collaboration et du financement des activités. Pour plus de détails, veuillez consulter le document *Synthesis progress report on the implementation of the Global Plan of Action for Animal Genetic Resources – 2012* (Rapport intérimaire de synthèse sur la mise en œuvre du Plan d'Action Mondial pour les Ressources Zoogénétiques – 2012),³ qui a été préparé pour la réunion du Groupe de Travail.

L'information présentée dans le *Rapport intérimaire de synthèse* a aussi été utilisée pour préparer un ensemble de trois affiches :

1. *Strategic priorities of the Global Plan of Action for Animal Genetic Resources*⁴ (Priorités stratégiques du Plan d'Action Mondial pour les Ressources Zoogénétiques; vue d'ensemble des priorités stratégiques du Plan d'Action Mondial aux échelles nationale, régionale et mondiale);
2. *Status of implementation of the Global Plan of Action for Animal Genetic Resources*⁵ (État de mise en œuvre du Plan d'Action Mondial pour les Ressources Zoogénétiques; indicateurs pour chaque priorité stratégique aux niveaux national, régional et mondial); et
3. *Colour scheme expressing levels of implementation of the Global Plan of Action for Animal Genetic Resources*⁶ (Échelle de couleur représentant les degrés de mise en œuvre du Plan d'Action Mondial pour les Ressources Zoogénétiques; échelle de couleur utilisée pour illustrer les indicateurs).

La préparation et planification d'une mise à jour de *L'État des Ressources Zoogénétiques pour l'Alimentation et l'Agriculture dans le Monde* étaient aussi à l'agenda du Groupe de Travail. Il a été prévu de présenter un deuxième rapport à la Commission des Ressources

Génétiques pour l'Alimentation et l'Agriculture en 2017, dix ans après la publication du premier rapport. Toutefois, en raison de la lourde charge de travail programmée pour la Seizième Réunion Ordinaire de la Commission en 2017, il a été demandé au Groupe de Travail de prendre en considération la possibilité d'avancer la préparation du deuxième rapport de deux ans, c'est-à-dire de conseiller à la Commission qu'elle sollicite à la FAO de présenter le rapport lors de la Quinzième Réunion Ordinaire de la Commission en 2015, ce qui impliquerait qu'une ébauche serait soumise à l'examen du Groupe de Travail vers la fin de l'année 2014. Le Groupe de Travail a recommandé à la Commission d'accepter cette programmation. Ce volume de *Ressources Génétiques Animales* a été mis sous presse avant la réunion de la Commission du mois d'avril, au cours de laquelle la recommandation du Groupe de Travail devait être examinée.

Qu'il soit présenté en 2015 ou ultérieurement, le deuxième rapport constituera une mise à jour du premier rapport d'autant plus qu'il présentera les changements survenus entre-temps pour ce qui est de l'état des ressources zoogénétiques et leur gestion et les derniers développements scientifiques dans les domaines pertinents. La charge de travail que représente la rédaction des rapports pour les pays serait réduite à un minimum, l'information sur l'état de la gestion des ressources zoogénétiques à l'échelon national étant obtenue par le biais de questionnaires spécifiques plutôt qu'en demandant aux pays d'élaborer des rapports détaillés du genre de ceux préparés pour le premier rapport.

Les points suivants étaient aussi à l'agenda du Groupe de Travail: une révision de la mise en œuvre de la Stratégie de Financement pour la mise en application du Plan d'Action Mondial pour les Ressources Zoogénétiques (la rencontre a coïncidé avec l'annonce de la première série de projets sélectionnés pour recevoir le soutien de la Stratégie de Financement);⁷ les rôles des petits éleveurs dans la conservation et l'utilisation durable des ressources zoogénétiques; objectifs et indicateurs pour les ressources zoogénétiques; situation et tendances en ce qui concerne les micro-organismes intervenant dans la digestion chez le ruminant; et une révision des résultats de la Première Réunion du Groupe de Travail de la Commission sur l'Accès et le Partage des Avantages.

Trente ans de la Commission

En plus d'être une année potentiellement occupée pour la communauté internationale des ressources zoogénétiques,

¹ <http://www.fao.org/docrep/meeting/027/mf227f.pdf>

² <http://www.fao.org/docrep/010/a1404f/a1404f00.htm>

³ <http://www.fao.org/docrep/meeting/026/me636e.pdf>

⁴ <ftp://DADnet:Mobile45@ext-ftp.fao.org/ag/reserved/dad-net/GPA.pdf>

⁵ <ftp://DADnet:Mobile45@ext-ftp.fao.org/ag/reserved/dad-net/Indicator.pdf>

⁶ ftp://DADnet:Mobile45@ext-ftp.fao.org/ag/reserved/dad-net/Traffic_light.pdf

⁷ http://www.fao.org/ag/aginfo/programmes/fr/genetics/Funding_strategy.html

l'année 2013 marque le trentième anniversaire de la Commission. Fondée en 1983 sous le nom de Commission des Ressources Phytogénétiques pour l'Alimentation et l'Agriculture, la Commission peut regarder en arrière sur une longue série de réussites, parmi lesquelles la négociation du Traité International sur les Ressources Phytogénétiques pour l'Alimentation et l'Agriculture et la préparation de Rapports sur l'État Mondial et Plans d'Action Mondiaux dans les domaines des ressources phytogénétiques et zoogénétiques. Initialement focalisé sur les cultures, le travail de la Commission s'est étendu par la suite aux animaux (l'élevage), puis à la sylviculture, aux ressources génétiques aquatiques et enfin aux invertébrés et micro-organismes. L'établissement de liens entre les différents

secteurs des ressources génétiques ainsi que leur rôle dans la prestation de services aux écosystèmes retiennent de plus en plus l'attention de la Commission, en particulier en vue de la préparation projetée d'un rapport sur *L'État de la Biodiversité pour l'Alimentation et l'Agriculture*.

Archives du journal

Les lecteurs seront peut-être curieux d'apprendre que tous les numéros antérieurs de *Ressources Génétiques Animales* sont disponibles sur le site web de Cambridge University Press,⁸ qui est aussi équipé d'un puissant moteur de recherche.

⁸ <http://journals.cambridge.org/action/displayBackIssues?jid=AGR>

Editorial

Encuentro intergubernamental

La Séptima Reunión del Grupo de Trabajo Técnico Intergubernamental sobre los Recursos Zoogenéticos para la Alimentación y la Agricultura se celebró en Roma en Octubre de 2012.¹ Tal y como se comentó en el editorial del volumen 51, una de las principales tareas que abordó el Grupo de Trabajo fue la revisión de los progresos alcanzados en la aplicación del Plan de Acción Mundial sobre los Recursos Zoogenéticos.² El Grupo de Trabajo acogió con agrado el considerable progreso realizado, pero admitió que quedan carencias por cubrir, en concreto en materia de mejora de la colaboración y del financiamiento de las actividades. El documento *Synthesis progress report on the implementation of the Global Plan of Action for Animal Genetic Resources – 2012* (Informe de síntesis de los progresos realizados en la aplicación del Plan de Acción Mundial sobre los Recursos Zoogenéticos – 2012),³ que fue preparado para la reunión del Grupo de Trabajo, recoge una información más detallada.

La información presentada en el *Informe de síntesis de los progresos realizados* también ha sido usada para preparar un conjunto de tres pósteres:

1. *Strategic priorities of the Global Plan of Action for Animal Genetic Resources*⁴ (Prioridades estratégicas del Plan de Acción Mundial sobre los Recursos Zoogenéticos; resumen general de las prioridades estratégicas del Plan de Acción Mundial a nivel nacional, regional y mundial);
2. *Status of implementation of the Global Plan of Action for Animal Genetic Resources*⁵ (Estado de aplicación del Plan de Acción Mundial sobre los Recursos Zoogenéticos; indicadores para cada prioridad estratégica a nivel nacional, regional y mundial); y
3. *Colour scheme expressing levels of implementation of the Global Plan of Action for Animal Genetic Resources*⁶ (Escala de color de referencia para el grado de implementación del Plan de Acción Mundial para los Recursos Zoogenéticos; escala de color usada para ilustrar los indicadores).

En la agenda del Grupo de Trabajo también se incluyeron la preparación y planificación de una actualización de *La Situación de los Recursos Zoogenéticos Mundiales para la Alimentación y la Agricultura*. Se ha previsto la presentación de un segundo informe a la Comisión de Recursos Genéticos para la Alimentación y la

Agricultura en 2017, diez años después de la publicación del primer informe. No obstante, debido a la fuerte carga de trabajo programada para la Decimosexta Reunión Ordinaria de la Comisión en 2017, se ha pedido al Grupo de Trabajo que considere la posibilidad de adelantar dos años la preparación del segundo informe, es decir recomendar a la Comisión que pida a la FAO que el informe se presente en la Decimoquinta Reunión Ordinaria de la Comisión en 2015, lo cual significaría que habría que tener un borrador listo para ser revisado por el Grupo de Trabajo a finales de 2014. El Grupo de Trabajo aconsejó que la Comisión aceptara esta programación. Este volumen de *Recursos Genéticos Animales* fue llevado a la imprenta antes del encuentro de la Comisión del mes de abril, en el cual se debía considerar la recomendación del Grupo de Trabajo.

El segundo informe, ya sea presentado en 2015 o posteriormente, supondrá en gran medida una actualización del primer informe puesto que presentará los cambios acaecidos, en los años de intervalo, en el estado de los recursos zoogenéticos y en su ordenación, así como los últimos desarrollos científicos en los campos pertinentes. La carga que supone para los países la elaboración de informes sería reducida a un mínimo. Así, la información sobre la situación de la gestión de los recursos zoogenéticos a nivel nacional sería recabada a través de cuestionarios específicos en vez de solicitando a los países informes detallados como los que se prepararon para el primer informe.

La agenda del Grupo de Trabajo también contempló una revisión de la implementación de la Estrategia de Financiación para la aplicación del Plan de Acción Mundial sobre los Recursos Zoogenéticos (el encuentro coincidió con el anuncio del primer conjunto de proyectos seleccionados para ser apoyados por la Estrategia de Financiación);⁷ el papel de los pequeños ganaderos en la conservación y uso sostenible de los recursos zoogenéticos; metas e indicadores para los recursos zoogenéticos; situación y tendencias respecto de los microorganismos relacionados con la digestión de los rumiantes; y una revisión de los resultados de la Primera Reunión del Grupo de Trabajo de la Comisión sobre el Acceso y la Distribución de Beneficios.

Treinta años de la Comisión

Además de ser un año potencialmente atareado para la comunidad internacional de los recursos zoogenéticos, 2013 es también el año del trigésimo aniversario de la Comisión. Fundada en 1983 como la Comisión de

¹ <http://www.fao.org/docrep/meeting/027/mf227s.pdf>

² <http://www.fao.org/docrep/010/a1404s/a1404s00.htm>

³ <http://www.fao.org/docrep/meeting/026/mc636e.pdf>

⁴ <ftp://DADnet:Mobile45@ext-ftp.fao.org/ag/reserved/dad-net/GPA.pdf>

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⁷ http://www.fao.org/ag/againfo/programmes/es/genetics/Funding_strategy.html

Recursos Fitogenéticos para la Alimentación y la Agricultura, la Comisión puede volver la vista atrás sobre una larga serie de logros, incluida la negociación del Tratado Internacional sobre los Recursos Fitogenéticos para la Alimentación y la Agricultura y la preparación de Informes sobre la Situación Mundial y Planes de Acción Mundial en los sectores de los recursos fitogenéticos y zoogenéticos. El ámbito de trabajo de la Comisión se ha ido expandiendo, desde su enfoque inicial sobre los cultivos, a los animales (la ganadería), en primer lugar, y posteriormente a la silvicultura, a los recursos genéticos acuáticos y a los invertebrados y microorganismos. La vinculación de los diferentes sectores de los recursos genéticos así como sus roles en la prestación de

servicios a los ecosistemas están centrando cada vez más el trabajo de la Comisión, sobre todo en vista de la planeada preparación de un informe sobre *La Situación de la Biodiversidad para la Alimentación y la Agricultura*.

Archivo de la revista

Los lectores pueden estar interesados en saber que todos los números anteriores de *Recursos Genéticos Animales* están disponibles en la página web de Cambridge University Press,⁸ la cual cuenta también con un potente motor de búsqueda.

⁸ <http://journals.cambridge.org/action/displayBackIssues?jid=AGR>

Morphological traits of duck and geese breeds of West Bengal, India

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Summary

The study pertains to phenotypic characterization of some breeds of duck (common white duck and Indian runner duck), Muscovy ducks (black and white feathered and sepia feathered) besides two breeds of geese (white and brown feathered and white feathered) reared in the state of West Bengal (India). The study was conducted at five locations of the state and comprised 1395 ducks and 600 geese. The data were analysed statistically using mainly descriptive statistics, the differences in mean were analysed using Duncan's multiple range test. Both qualitative and quantitative traits were considered in the study. The qualitative traits were shank colour, bill colour, colour of the feathers, skin colour, egg shell colour, the presence or absence of beans, body carriage, bill type and colour of the eyes, while the quantitative traits included in the study were weight of the ducks and weight of the eggs. Some production traits such as numbers of eggs laid per year and dressing percentage of the drakes and ganders of each breed too have been studied. The ducks and geese are raised under semi-intensive management system and mostly depend on scavenging for their nutritional needs. This results in poor egg production and at times loss of stock because of diseases. The study regarding average egg production indicated that the Muscovy ducks and the geese have poor egg production, whereas the Indian runner followed by the common white duck are potentially the best. The ducks are important source of earnings for the small holder farmers and are raised both for meat and eggs, while the geese are reared mostly for ornamental purpose. However, the populations of the ducks are fast dwindling because of avian influenza in the region and because restocking is mostly being carried out with less adapted Khaki Campbell ducks. This happens mainly because the government farms that were responsible for providing the ducklings for restocking maintain Khaki Campbell ducks and do not have the parental stock of the native duck breeds, while restocking of the Muscovy ducks and geese are carried out by the rearers themselves. There are also no prevailing breeding programmes to conserve, select, maintain and distribute the native breeds of duck and geese. Hence, it is of earnest importance to conserve the avian genetic resources before the population dwindles further.

Keywords: duck, geese, egg production, phenotypic characterization, West Bengal, India

Résumé

L'étude se rapporte à la caractérisation phénotypique de quelques espèces de canard (le canard blanc commun et le canard de coureur indien), Muscovy esquive (le noir et le blanc aux plumes et sépia aux plumes) outre deux espèces d'oies (le blanc et le marron aux plumes et blancs aux plumes) a élevé dans l'état de Bengale d'ouest (l'Inde). L'étude a été dirigée à cinq emplacements de l'état et compris de 1395 canards et 600 oies. Les données ont été statistiquement analysées utilisant la statistique descriptive, les différences dans les moyens ont été analysées utiliser Duncan le test de Gamme Multiple. Traits qualitatifs et quantitatifs ont été considérés dans l'étude. Le trait qualitatif était la couleur de jambe, la couleur du bec, la couleur des plumes, la couleur de peau, pousser la couleur de coquille, la présence ou l'absence de haricots, la couleur de corps, facturent le type et la couleur des yeux, pendant que les traits quantitatifs inclus dans l'étude étaient le poids des canards et le poids des oeufs. Quelques traits de production à savoir les nombres d'oeufs posé par an et habiller le pourcentage des canards et des oies de chaque espèce ont été aussi étudié. Les canards et les oies sont élevés le système de direction en dessous à demi intensif et dépendent surtout de récupérer pour leurs besoins nutritifs. Ceci a pour résultat la production pauvre d'oeuf et à la perte de temps de du stock en raison des maladies. L'étude quant à la production d'oeuf de moyenne indique que le canard de Muscovy et les oies ont la production d'oeuf pauvre où comme le coureur indien suivi par le canard blanc commun est potentiellement le meilleur. Les canards sont la source importante de gains pour les petits agriculteurs de support et sont élevés pour la viande et les oeufs pendant que les oies sont surtout élevées pour le but décoratif. Toutefois, les populations des canards diminuent rapidement en raison de la grippe d'avian dans la région et que le regarnir est surtout exécuté avec les canards de Campbell de moins de Kaki adapté. Ceci a été principalement exécuté parce que les fermes de gouvernement qui étaient responsables de fournir les canetons pour regarnir maintiennent les canards de Campbell de Kaki et n'ont pas le stock parental des espèces de canard natales en regarnissant pour les canards de Muscovy et les oies sont exécuté par le rearers se. Il n'y a pas aussi prévaloir élève des programmes pour préserver, choisit, maintient et distribuer les espèces natales de canard et les oies. Donc; c'est d'importance sérieuse pour préserver l'avian les ressources génétiques avant que la population diminue plus ample.

Mots-clés: canard, oies, production d'œufs, caractérisation phénotypique, le Bengale Occidental, Inde

Resumen

El estudio pertenece a la caracterización fenotípica de algunas castas de pato (pato blanco común y pato indio de corredor), Muscovy agacha (blanquinegro emplumado y la sepia emplumó) aparte de dos castas de gansos (blanco y marrón emplumó y blanco emplumó) crió en el estado de Bengala Occidental (India). El estudio fue realizado en cinco posiciones del estado y comprendido de 1395 patos y 600 gansos. Los datos fueron analizados utilizando estadísticamente la estadística descriptiva, las diferencias en el medio fueron analizadas utilizar prueba Múltiples de Gama de Duncan. Ambos rasgos cualitativos y cuantitativos fueron considerados en el estudio. El rasgo cualitativo fue color de zanca, color de cuenta, el color de las plumas, color de piel, incita color de esqueleto, la presencia o la ausencia de alubias, el coque del cuerpo, factura tipo y color de los ojos, mientras los rasgos cuantitativos incluidos en el estudio fueron pesos de los patos y el peso de los huevos. Algún v.gr. de rasgos de producción. números de huevos colocados por año y vestir porcentaje de los patos y gansos de cada casta también ha sido estudiado. Los patos y los gansos son levantados bajo sistema medio intensivo de gestión y dependen en su mayor parte de la barrer para sus necesidades nutricionales. Esto tiene como resultado la producción pobre de huevo y a veces pérdida de acciones debido a enfermedades. El estudio con respecto a la producción de huevo de promedio indica que el pato de Muscovy y los gansos tienen la producción pobre de huevo donde como el corredor indio seguido por el pato blanco común es potencialmente el mejor. Los patos son fuente importante de ganancias para los pequeños granjeros de poseedor y son levantados para carne y huevos mientras los gansos son criados en su mayor parte para propósito decorativo. Sin embargo, las poblaciones de los patos menguan rápidamente debido a la gripe aviar en la región y que la reabastecer es llevada a cabo en su mayor parte con patos menos adaptados de tela de uniforme Campbell. Esto fue llevado a cabo principalmente porque las granjas del gobierno que fueron responsables de proporcionar los patitos para la reabastecer mantienen que patos de tela de uniforme Campbell y no tienen las acciones paternas de las castas nativas de pato al reabastecer para los patos de Muscovy y gansos son llevados a cabo por el rearers sí mismos. No hay también prevalecer que cría programas para conservar, seleccionar, mantener y distribuir las castas nativas de pato y gansos. de ahí; es de la importancia seria de conservar los recursos genéticos aviares antes que la población mengüe adicional.

Palabras clave: *pato, gansos, producción de huevos, caracterización fenotípica, Bengala Occidental, India*

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Introduction

The state of West Bengal is situated between 21°25'24" and 27°13'15" N latitudes and 85°48'20" and 89°53'04" E longitudes. The state shares its borders with Bangladesh, Bhutan and Nepal – and four other Indian states, such as Orissa, Jharkhand, Assam and Sikkim.

The climate of the state is predominantly hot and extremely humid except for the Northern hilly district of Darjeeling. The state has the highest population density in the country and it is estimated that a total of 72 percent of the human population of the state reside in the rural areas. The residents in the rural areas depend on agriculture and allied activities for their livelihood (NABCONS 2010). Most of the farmers have small land holdings and thus small-scale poultry plays a substantial role in ensuring food security for the family besides assisting in poverty reduction. The villages in the state have water bodies that serve multiple purposes (source of water for drinking, bathing and also washing clothes and utensils) for majority of the residents. According to Besbes (2009), globally the ducks contribute 11 percent and geese 9 percent of the global poultry sector. However, in spite of the significantly high contribution of the indigenous ducks to the rural economy (especially in the coastal regions) of India, research and developmental studies on indigenous duck and geese breeds are by and large at its infancy. Tixier-Boichard, Ayalew and Jianlin (2008) suggested that characterization and inventory of poultry genetic resources are needed in countries where clearly defined poultry breeds are yet to be identified; hence properly

designed scientific studies on indigenous duck and geese breeds of India need to be prioritized.

According to the reports of DAHDF (2006), the state of West Bengal has the highest duck population in India. The annual increase in duck population in West Bengal between 1997 and 2003 indicate that the annual growth rate for the native breeds/types was assessed to be 22.67 percent, while there was a reduction of 40.3 percent in the numbers of exotic duck breeds. The national trend regarding the growth of the ducks too indicated similar trend (1997–2003), while the numbers of native ducks increased by 21.35 percent, those of the exotic ones decreased by 65.87 percent during the same period DAHDF (2006). The state of West Bengal also possesses 75 percent of the total layer type duck breeds in the country; in spite of having such a large population, the average number of eggs per duck is slightly lower than those of the national average of 106 eggs per year, which may be attributed to the genotypes and management of the ducks and geese. Most of the rearers belong to economically challenged section of the society and are unable to provide much needed balanced nutrition, proper management and health services. Still the state contributed around 70 percent of the total number of duck eggs consumed in the country which may be attributed to the large duck population as mentioned earlier. The ducks are mostly seen foraging in such water bodies which may be privately owned or even communal in nature. The ducks are reared both for their meat and eggs, while

geese are mostly reared for ornamental purpose although some people do consume geese meat.

However, there has since been a reduction in the number of native duck population in many districts of the West Bengal because of the outbreak of avian influenza in 2007 and again in 2008. The outbreak of this disease resulted in culling of all domesticated avian species. The restocking was later carried out by introduction of exotic duck breeds (mainly Khaki Campbell) under the guidance of the authorities of Animal Resources Development Department. The restocking has resulted in dilution of the duck genetic resources in the state in general and in the affected areas in particular.

The contribution of the ducks can be assessed by the fact that almost every rural household have a couple of them and duck eggs fetch higher price compared with those from the hens. The other reason why the native ducks are preferred over the exotic duck breeds is because their eggs fetch higher price. Traditional cuisines prepared of duck eggs and meat is considered as delicacies by the residents of the state. The eggs of the native duck breeds are preferred by the consumers for their taste, pigmentation and suitability for traditional cuisines. The eggs of the geese and that of the Muscovy ducks are seldom consumed by the rearers as the eggs are mostly used for restocking purpose.

The observation finds analogy with the observations of Halder, Ghoshal and Samanta (2007) from West Bengal and Gajendran and Karthickeyan (2009) from Tamil Nadu, India, FAO (2011). The preference of native ducks over the improved breeds and hybrids has also been reported by Jalil, Begum and Nahar (1993) and Rehman *et al.* (2009).

Materials and methods

The study was conducted in five districts of West Bengal namely Midnapur (East) (MID), 24 Parganas (South) (24 P (S)), 24 Parganas (North) (24 P (N)), Nadia (NAD) and Murshidabad (MUR) (Table 1). The three gram panchayats (local administrative bodies) were selected randomly from each district. Thereafter, villages within a gram panchayat were selected purposively keeping in mind the fact that no ducklings of exotic types were distributed in the selected villages by the local authorities in the near past. The households selected for interviews within the villages too were selected purposively keeping in mind that the owner reared only the native ducks, the houses having exotic or even seem to be cross-bred ducks were not included in the survey and the adjacent houses from where the flocks can intermingle were also not taken into consideration. This led to few numbers of household per village. The families who had recently procured native ducks from nearby markets or received them as gifts from acquaintances too were not taken into account. The percentage of different duck and geese breeds

in the study vis-à-vis the total duck population as a whole in the areas studied is presented in Table 2.

The result of the study comprises both qualitative and quantitative traits of 1395 ducks and 600 geese of various breeds which were/are reared in the studied villages. The description of qualitative traits considered in this study were assessed according to the guidelines suggested by Manuel (2008). The qualitative traits studied were shank colour (white, blue and yellow), bill colour (pink white, orange, yellow, white and brown), colour of the feathers (specific colours or mixed), skin colour (white, yellow or grey), egg shell colour (white, cream or blue), the presence or absence of beans and colour of beans (white, black or dark brown), shape of bill (uniform or saddle), body carriage (horizontal, slight upright or upright) all of which were recorded through visual observation, while the quantitative traits were weight of the ducks and weight of the eggs. The age of the ducks was not considered as a parameter in the study and only adult ducks were considered for the quantitative traits. The results in Tables 3 and 4 have been presented separately for drakes and ducks and also ganders and geese because this would help the authorities to make separate selection strategies for males and females. This is also because the selection intensity for the two sexes differs; hence such information would be useful for further conservation and breeding programmes.

The rearers were interviewed using a pretested questionnaire which pertained to the prevalent duck husbandry practices in the different study areas; the questionnaire also included the questions pertaining to housing feeding, watering, disease management/treatment, marketing of the eggs and ducks, role of different family members in duck husbandry practices, breed preferences for eggs and meat purposes, average number of eggs laid by a duck, hatchability and mortality. The price of the ducks and eggs were also taken into consideration to assess the importance of the ducks among the rearers. The ducks, geese and the eggs were weighed on an electronic balance with an error margin of ± 0.5 g. The dressing percentage was assessed by slaughtering the drakes and ganders followed by hot water scalding and evisceration of the gut contents including the skin. The dressing percentage was calculated according to the method suggested by Sahin and Yardimci (2009). The results were analysed statistically using SPSS v-12 for Windows (2003), the means and standard deviations (SD)/standard errors (SE) were computed using descriptive statistics, the means for the quantitative traits were compared using Duncan's Multiple Range Test and the values were considered significant at $p < 0.05$.

Results and discussions

Duck husbandry practices in the study areas

The common duck (locally known as desi/Pati hans), (Figure 1) has no definite feather colour pattern and the colour of the bill too varies from duck to duck. This

Table 1. Location of the study zones and number of ducks surveyed under each study site.

District	Name of the panchayat	Number of ducks and geese	Temperature	Latitude	Longitude	Altitude	Numbers of ducks	Reference
MID (East)	Itanogra-2, Lakshya-1, Amritberia, Bekundu and Natshal-2	385	(07–39.0°C) highly humid	22°11' N	87°59'E	4 m amsl	7 84 442 ^a (48.02%)	DARAH (2006a) ^a
MUR	Andulberia-1, Begunbari, Mohula-2, Dadpur and Debkundu	382	(18–38.5°C) highly humid	23°55'60" N	88°32'18" E	19 m amsl	1 410 503 ^a (97.19%)	DARAH (2006 b) ^b
24 P (S)	Thakurchak, Baharu and Bhagabampur	279	(10–37.5°C) highly humid	22°10'33" N	88°25' 4"E	2 m amsl	1 913 040 ^a (66.67%)	DARAH (2006c) ^c
1. Joynagar, Mazilpur							72 314 ^b	
2. Basanti	Basanti town	195		22°11'21" N	88°40'14" E	1 m amsl	88 508 ^b	
24 P (N)	Amdanga, Kampa, Cakla and Maricha	347	(18–37.5°C) highly humid	22°55'58" N	88°32'18" E	10 m amsl	2 016 202 ^a (47.99%)	DARAH (2006d) ^d
1. Jaguli							90 717 ^b	
NAD	Birohi-1, Fatchpur, Mollaberia and Nagurukhra-1	407	(18–37.5°C) highly humid	22°58' 60" N	88°28'60" E	10 m amsl	7 16 194 ^a (96.02%) 46	DARAH (2006e) ^e
1 Haringhata							021 ^b	
2. Chakdah	Madanpur-1, Simurali-2			23°4'60" N	88°31'E	10 m amsl	51 694 ^b	

Note: ^aNumber of native ducks in the district. The values in parentheses indicate the percentage of the native fowls vis-à-vis total duck population in the study area. ^bEstimated ducks in the panchayats studied. m amsl: meters above mean sea level; DARAH: Directorate of Animal Resources and Animal Health, Government of West Bengal.

Table 2. Number of respondents, their age, their experience in rearing ducks and average numbers of ducks per house hold selected.

District	Number of households interviewed	Sex of the respondent		Age of the respondent (years) (mean ± SD)		Average number of years rearing (years) of ducks and geese/household (mean ± SD)		Average numbers of (heads) of ducks and geese/household (mean ± SD)	
		Male	Female	Male	Female	Ducks	Geese	Ducks	Geese
MID (East)	45	8	37	32.5 ± 10.2 (22–53)	37.9 ± 7.2 (18–60)	5.6 ± 2.3 (3–9)	4.2 ± 2.6 (2–9)	5.2 ± 2.3 (2–8)	2.5 ± 1.5 (1–6)
MUR	50	12	38	34.3 ± 8.6 (18–52)	42 ± 10.4 (21–65)	6.25 ± 4.2 (2–10)	3.8 ± 1.6 (1–10)	4.5 ± 2.7 (2–7)	3.7 ± 1.2 (2–5)
24 P (S)	65	15	50	39.5 ± 11.2 (22–52)	39.5 ± 9.9 (23–63)	7.7 ± 2.1 (4–9)	5.5 ± 1.5 (2–8)	4.7 ± 2.6 (2–7)	2.4 ± 1.4 (1–4)
24 P (N)	40	6	34	37.5 ± 12.2 (19–55)	29.2 ± 16.5 (16–58)	8.7 ± 3.3 (4–12)	4.7 ± 2.4 (2–7)	7.2 ± 2.6 (3–9)	2.1 ± 0.8 (1–3)
NAD	55	10	45	33 ± 15.4 (17–52)	33.1 ± 14.3 (15–55)	8.9 ± 4.3 (3–14)	5.8 ± 1.5 (3–7)	4.7 ± 3.3 (2–9)	2.6 ± 1.3 (1–5)
Average		10	41	35.4	36.3	7.4	4.8	5.3	2.7

Note: Values in parentheses indicate the range of values.

Table 3. Percentages of different phenotypes of ducks in the study area.

Districts	Sada Pati hans		Runner		Common duck		Muscovy black and white		Muscovy sepia		Geese white and brown		Geese white		Exotics and cross-breeds	
	Drake	Duck	Drake	Duck	Drake	Duck	Drake	Duck	Drake	Duck	Gander	Geese	Gander	Geese	Drake	Duck
MID (East)	16.2 ^b	22.1 ^a	0.05	0.08	45.75 ^a	40.2 ^a	3.2 ^d	4.7 ^e	0.0	0.0	8.9 ^c	9.7 ^b	11.4 ^d	12.2 ^c	14.15 ^a	11.02 ^a
MUR	19.2 ^a	20.5 ^b	0.0	0.0	41.7 ^b	39.3 ^a	6.9 ^c	9.5 ^d	1.7 ^d	1.3 ^c	10.5 ^a	11.2 ^a	12.2 ^c	13.7 ^b	7.8 ^b	4.5 ^b
24 P (S)	15.5 ^b	18.1 ^c	0.0	0.0	35.1 ^c	32.5 ^c	12.7 ^a	15.5 ^a	3.3 ^c	3.7 ^b	10.2 ^a	10.6 ^a	14.7 ^a	14.9 ^a	8.5 ^b	1.7 ^c
24 P (N)	19.1 ^a	20.2 ^b	0.0	0.0	35.2 ^c	36.6 ^b	9.9 ^b	10.5 ^c	4.1 ^b	5.3 ^a	10.7 ^a	10.9 ^a	13.9 ^b	13.8 ^b	7.1 ^b	2.7 ^c
NAD	18.5 ^a	21.0 ^b	0.0	0.0	35.9 ^c	31.5 ^c	10.2 ^b	13.2 ^b	5.5 ^a	5.7 ^a	9.3 ^b	9.8 ^b	14.1 ^a	15.9 ^a	6.5 ^b	2.9 ^c
Total average	17.7	20.4	0.05	0.08	36.8	36.0	8.6	10.7	3.7	4.0	10	10.4	13.3	14.1	8.9	4.6

a,b,c,d,e Values with different subscripts across columns differ significantly, $P < 0.05$.

Table 4. Body weight (g $\pm$ sd) of different breeds of ducks and geese observed in the studied districts of West Bengal.

District	Common duck		Sada Pati hans		Runner		Muscovy black and white		Muscovy sepia		Geese white and brown		Geese white	
	Drake	Duck	Drake	Duck	Drake	Duck	Drake	Duck	Drake	Duck	Gander	Geese	Gander	Geese
MID (East)	1250 $\pm$ 92 ^c	1125 $\pm$ 88 ^b	1375 $\pm$ 105 ^b	1350 $\pm$ 115 ^b	1150 $\pm$ 110	1295 $\pm$ 56	2650 $\pm$ 210 ^a	1536 $\pm$ 212 ^c	—	—	3954 $\pm$ 279 ^a	3470 $\pm$ 202 ^a	3950 $\pm$ 220 ^a	3550 $\pm$ 185 ^b
N	38	32	40	46	20	22	35	30	—	—	32	35	25	30
MUR	1250 $\pm$ 80 ^c	1050 $\pm$ 75 ^b	1380 $\pm$ 98 ^b	1315 $\pm$ 56 ^c	—	—	2554 $\pm$ 250 ^b	1665 $\pm$ 125 ^b	1950 $\pm$ 119 ^c	1420 $\pm$ 196 ^c	3696 $\pm$ 312 ^b	3364 $\pm$ 274 ^a	3800 $\pm$ 175 ^c	3500 $\pm$ 170 ^b
N	32	32	35	40	—	—	24	32	34	30	35	37	22	29
24 P (S)	1390 $\pm$ 150 ^a	1295 $\pm$ 95 ^a	1395 $\pm$ 112 ^b	1225 $\pm$ 112 ^d	—	—	2589 $\pm$ 195 ^b	1722 $\pm$ 165 ^a	2235 $\pm$ 132 ^a	1332 $\pm$ 117 ^d	3980 $\pm$ 259 ^a	3018 $\pm$ 395 ^c	3750 $\pm$ 225 ^c	3400 $\pm$ 185 ^c
N	47	45	62	60	—	—	42	34	30	35	27	32	25	35
24 P (N)	1370 $\pm$ 95 ^b	1110 $\pm$ 105 ^b	1305 $\pm$ 125 ^c	1300 $\pm$ 110 ^c	—	—	2129 $\pm$ 207 ^c	1489 $\pm$ 175 ^d	2190 $\pm$ 127 ^b	1470 $\pm$ 106 ^b	3642 $\pm$ 396 ^b	2977 $\pm$ 222 ^c	4050 $\pm$ 175 ^a	3750 $\pm$ 220 ^a
N	39	36	25	32	—	—	27	31	15	20	29	33	28	32
NAD	1400 $\pm$ 102 ^a	1290 $\pm$ 89 ^a	1456 $\pm$ 106 ^a	1386 $\pm$ 25 ^a	—	—	1996 $\pm$ 125 ^d	1770 $\pm$ 296 ^a	2024 $\pm$ 117 ^c	1550 $\pm$ 107 ^a	3697 $\pm$ 282 ^b	3162 $\pm$ 268 ^b	3900 $\pm$ 150 ^b	3500 $\pm$ 225 ^b
N	48	43	34	37	—	—	39	32	28	32	22	27	32	33
Average	1332 $\pm$ 104	1174 $\pm$ 90	1382.2 $\pm$ 109	1315 $\pm$ 84	1150 $\pm$ 110	1295 $\pm$ 56	2383 $\pm$ 197	1636 $\pm$ 195	2109.8 $\pm$ 133	1450 $\pm$ 134	3793.8 $\pm$ 306	3198 $\pm$ 272	3890 $\pm$ 189	3540 $\pm$ 197

a,b,c,d,e Values with different subscripts across columns differ significantly, $P < 0.05$.



Figure 1. Selling ducks at village haat.

may be because panmixia is practiced in the study areas. The feather colours may vary from dark brown to white with intermediate colours. The results from Table 2 indicate that the majority of the respondents were women. Fewer number of male respondents may be because male members leave early in the morning and return late to their home in the evenings as majority of them were associated with some form of agrarian activity, some were daily wage labours, while a few were petty businessmen and were not available at home. Although the women were involved with the husbandry practices and sales of eggs, the male members were mostly involved in the sales of adult ducks, building houses, taking the sick ducks to the veterinarians or local para veterinarians and also sale of the adult ducks. The results from Table 2 also indicate that the average age of the respondents were 35.4 years for the males and 36.3 years for the females. The study also indicated that on an average the respondents had been rearing ducks for the last 7.4 years, while that of geese were 4.8 years. This may be because the geese are primarily raised for ornamental purpose with hardly any economic importance to the rearers. It can therefore be inferred that the respondents had sufficient experience in matters related to the duck husbandry practices. The flock size vary largely on the economic status of the raisers, the study revealed that the flock size can vary from 2 to 9 ducks per household and the average flock size was assessed to be around 5.3 ducks per household. The results as obtained in this study find consonance

with the observations of Halder, Ghoshal and Samanta (2007) from West Bengal, the values are well within the range reported by Hoque *et al.* (2010) from ducks, reared in coastal areas of Bangladesh.

The drake to duck ratio is usually 1 drake for 7.5 ducks, while Halder, Ghoshal and Samanta (2007) reported higher drakes to ducks ratio. The difference in ratio as observed by Halder, Ghoshal and Samanta (2007) may be attributed to the sample size and in limited study area. The less numbers of drakes as observed in this study may be because they are raised for meat and are usually sold at an early age. The study also indicates that the average flock size varied between the studied locations with the lowest number of ducks per flock observed in MUR, while the largest flock size was observed in the studied locations at 24 P (N), while the reverse was true for the geese.

The flock size for the Muscovy ducks are usually smaller and vary from 2 to 15 ducks at most averaging around 4.5 ± 2.5 ducks, the drake : duck ratio in the Muscovy ducks are more or less similar to those assessed with the common ducks, the Muscovy ducks are not reared by all members of the society and are mostly popular among the people following Islam faith and also members of lower socio-economic strata. Although the geese are reared for ornamental purpose and also for guarding the homes and the flock size varies from 1 to 6 averaging around 2.7 heads per household.

The ducks are mostly reared separately in enclosures which are adjacent to the homes of the rearers. However, the ducklings are reared mostly under bamboo baskets or under the mosquito nets. The ducklings are reared separately till they are strong enough to accompany the older flock. The observations are similar to the reports of Halder, Ghoshal and Samanta (2007) and Hoque *et al.* (2010). The ducklings are confined separately because they are unable to protect themselves from predators, while foraging with the older flocks. The common ducks are reared separately from the geese and the Muscovy ducks.

The night enclosures for the ducks are mostly (85 percent) made of locally available materials such as mud and wood/bamboo/corrugated sheet, while some of the respondents had the night shelter for their ducks prepared from mortar and bricks, the observations are in consonance with of the reports of Khanum, Chwalibog and Huque (2005) and Rehman *et al.* (2009) from Bangladesh. The doors of the enclosure are closed at night to prevent the attack from predators like wild cat and foxes. The drakes and geese are mostly allowed to forage for themselves. The ducks in lay, brooding or with ducklings are provided with additional supplements which are usually kitchen scrapes, i.e. rice leftover and rice bran which at times is mixed with the rice gruel. The ducks are also provided with molluscs and other aquatic snails occasionally, but this depends on the availability. Similar observations have also been reported by Hoque *et al.* (2001), Rehman *et al.* (2009)

and Hoque *et al.* (2010). However, the availability of the molluscs varies from location to location; in general, the quantity of molluscs is decreasing owing to the use of agrochemicals where its runoff diminishes aquatic fauna and flora and also leads to occasional poisoning of the ducks.

The feed supplements are usually provided in earthen vessels which are seldom cleaned and are the major source of infection in the flocks. Water is seldom provided to the ducks and geese and they obtain the same from ponds and water bodies, the observations are in consonance with the results of Haque, Ukil and Hossain (1993), Fouzdar, Khaleque and Alam (1999), Haque *et al.* (2003) and Halder, Ghoshal and Samanta (2007). The ducks are quite tolerant to many of the commonly prevalent diseases; however, deaths because of hepatitis, botulism, plague and cholera are quite common in the region, the duckling's being more susceptible when compared with the adults, the observations being in consonance with that of Hoque *et al.* (2010). The study also indicates that the average survivability of the ducklings vary between 40 and 80 percent averaging around 65 percent, higher mortality has been observed in the monsoon season when the temperature is hot and the relative humidity is quite high leading to various disease incidences such as cholera and dysentery. The minimum mortality has been observed to be in the spring and summer. Accidental deaths because of chills have also been reported especially during the winter months.

The eggs are mostly sold by the women to the local traders locally known as "phoreys". The women usually use the sale proceeds to procure items of daily household need, the eggs of the Muscovy ducks and that of the geese are seldom traded and are used for hatching purpose. It has also been observed that raising ducks is mostly carried out by women, the findings are in accordance with that of previous researchers (Maji, 1995; Halder, Ghoshal and Samanta, 2007; Hoque *et al.*, 2010). The price of the duck eggs is higher than those of the chickens, which might be attributed to their larger size and culinary usages. The average price of an egg as received by the rearers vary between Rs. 2.75 and 3.50 averaging around Rs. 3.25 (US \$1 = Rs 55.00 approx.), while the same is usually retailed at Rs. 6.00–7.00 per egg. The ducks are sold by the male members of the family and seldom do women participate in the sale of the ducks; however, recently, it has been observed that members of certain self-help groups (mostly women) do come to the market to sell the ducks and fowls they have raised (Figure 1).

The ducks lay their eggs early in the morning after which they are allowed to forage. The reason for poor hatchability can be because the night enclosures are mostly devoid of any proper nests and that the eggs are laid on the ground which is often wet and dirty, thereby soiling the eggs. According to the respondents, most of these soiled eggs have very poor hatchability and are hence used for table purposes or sold. The hatchability of the eggs of the

common ducks varies from 50 to 75 percent, averaging around 63 percent, the higher range of the results are in consonance with the observations of Gajendran *et al.* (2005), the range value of hatchability values as obtained in the study is in consonance with the results of Ravindran, Venugopalan and Ramkrishnan (1984), Alam and Hossain (1989), Saha, Chowdhury and Hamid (1992), Islam *et al.* (2002) and Rahman *et al.* (2009). The lower value is in accordance with the observations of Chowdhury *et al.* (2004) The hatchability percentage varies from season to season, (Sastry, Thomas and Singh 1996; Das and Ali, 1999; Farooq *et al.*, 2003), The respondents reported that the hatchability was least during the months of May–August, when the temperature and humidity is the highest, similar observations were also reported by Khalequzzaman, Shah Hussain Ahmad Mahdi and Mahbur Rahman (2006).

The mortality among the ducklings are usually quite high and varies from 30 to 70 percent, which also varies from season to season and also the housing and husbandry practices, the average values as reported by the respondents was around 55 percent, while the hatchability of the Muscovy ducks vary between 45 and 75 percent averaging around 55.5 percent, the results as assessed in the study finds consonance with the observations of Banga-Mboko *et al.* (2007) from Congo, hatchability of the eggs of Muscovy ducks was reported to be the least in the summer months. The findings are in accordance with the observations of Nickolova (2005) and, Khalequzzaman, Shah Hussain Ahmad Mahdi and Mahbur Rahman (2006) who reported that the poor hatchability is a fall out of the ducks to optimize the egg temperature during brooding. The yolk of Muscovy ducks have very high fat content releasing heat in the second half of the incubation period, hence, cooling of the eggs is mandatory during that phase, which if overlooked can lead to poor hatchability. Geese, however, have slightly better hatchability ranging between 65 and 80 percent, averaging around 72.5 percent. The results presented in Table 7 indicate that the average dressing percentage did not vary significantly between the Muscovy drakes (black and white feathered), and ganders of both breeds. However, the dressing percentage of the Muscovy drakes (sepia feather) colour was $P < 0.05$ lower than those of the two breeds of ganders and Muscovy drakes (white and black feather coloured). The dressing percentage of the common ducks, sada pati hans and runner breed did not vary significantly between them but varied $P < 0.05$ with the Muscovy drakes (of both the breeds) and the ganders.

Some common breeds of ducks

The common duck

The common duck is locally known as desi/pati hans (Figure 2) has varied feather colours from almost white to black with intermediates, the colour of the shank and bill is usually slate grey and uniform. The carriage of the



Figure 2. Pati Hans or common ducks.

ducks is slightly upright, the bills are devoid of any beans. The ducklings are born with dark to yellow colour down feathers. The drakes are identified by the upward curving of feather near the back of the drake. The average body weight of the ducks and drakes as presented in Table 4 finds consonance with the observations of Rashid, Barua and Bulbul (1995) and ILRI (2004). The results from Table 4 indicate that the highest body weight was observed in the drakes and ducks reared in 24 P (S) and NAD district, while the ones reared in MUR and MID weighed the least. This may be attributed to large numbers of

ponds and water bodies in these districts. As indicated by the respondents, the average age at first laying is around 180.5 ± 15.5 days; the result being in consonance with that of Hoque *et al.* (2001), Islam *et al.* (2003), Das *et al.* (2008), Gajendran and Karthickeyan (2009), Rehman *et al.* (2009). The average annual numbers of eggs (Table 5) as reported by the rearers were highest in 24 P (S), while the least numbers of eggs were reported from MUR and NAD. The average number of eggs as observed in the study finds consonance with the observations of Salam and Bulbul (1983), Haque and Ukil (1994), Haque *et al.* (2003) and Rehman *et al.* (2009). The number of eggs as obtained from the local desi duck varies with types and nutrition of the ducks, the average annual number of eggs from the desi ducks are similar to the observations of Haque *et al.* (2003), Halder, Ghoshal and Samanta (2007) and Rahman *et al.* (2009). The average weight of the eggs (Table 6) was highest in the desi ducks reared in 24 P (S), while those from NAD were the least. The average egg weight as observed is in agreement with the observations of Rithamber, Reddy and Rao (1986), Das and Hoque (2000), Khanum, Chwalibog and Huque (2005), Kabir *et al.* (2007), Das *et al.* (2008) and Rehman *et al.* (2009). The egg weight is, however, higher than those reported by Hoque *et al.* (2010), the average clutch size as reported by the rearers is around 7–10 eggs. The skin colour of these ducks varies from white to yellow. The colour of the eyes is dark. The average dressing percentage (Table 7) as observed in the study is only slightly lower than those reported by Ansary *et al.* (2008) for cross-bred ducks reared in Bangladesh.

The common white duck

The common white duck is locally known as sada pati hans (desi white duck/common white duck), (Figure 3) is characterized by white colour of the feathers and the shank and the bill are orange in colour. The body carriage is horizontal type and the bills have white coloured beans which are even observed in the ducklings. The ducklings are born with yellow down feather (Figure 4) which is

Table 5. Average (mean $\pm$ SD) number of eggs obtained from breeds of ducks and geese on an annual basis.

Districts	Desi duck	Sada Pati hans	Runner	Muscovy black and white	Muscovy sepia	Geese white and chocolate	Geese white
MID (East)	90 $\pm$ 15.5 ^a	130 $\pm$ 15.5 ^b	180 $\pm$ 20.2	37 $\pm$ 4.7 ^a	—	21.7 $\pm$ 3.6 ^b	24.5 $\pm$ 2.5 ^b
Number of respondents	22	18	5	12		15	10
MUR	62 $\pm$ 20.7 ^d	127 $\pm$ 12.6 ^b	NR	35 $\pm$ 8.9 ^a	40.3 $\pm$ 4.3 ^a	24.5 $\pm$ 2.5 ^b	22.7 $\pm$ 3.2 ^c
Number of respondents	32	14		12	5	22	20
24 P (S)	89 $\pm$ 10.4 ^a	132 $\pm$ 20.2 ^b	NR	28.5 $\pm$ 5.5 ^b	33.5 $\pm$ 2.5 ^c	27.5 $\pm$ 2.2 ^a	25.2 $\pm$ 2.7 ^b
Number of respondents	44	28		21	19	17	21
24 P (N)	85 $\pm$ 12.7 ^b	125 $\pm$ 17.2 ^c	NR	33.2 $\pm$ 5.5 ^b	41.5 $\pm$ 3.5 ^a	22.5 $\pm$ 3.5 ^b	22.9 $\pm$ 4.2 ^c
Number of respondents	22	16		14	11	13	19
NAD	74 $\pm$ 15.7 ^c	138 $\pm$ 16.5 ^a	NR	35.7 $\pm$ 3.8 ^a	36.7 $\pm$ 4.5 ^b	23.2 $\pm$ 3.2 ^b	30.5 $\pm$ 3.4 ^a
Number of respondents	21	13		12	17	14	12
Total average	80.0 $\pm$ 15	130.4 $\pm$ 16.4	180 $\pm$ 20.2	33.9 $\pm$ 5.7	36.9 $\pm$ 3.5	23.9 $\pm$ 3	25.2 $\pm$ 3.2
N	141	89	5	71	52	81	82

^{a,b,c,d}Values with different subscripts across columns differ significantly, $P < 0.05$.

Table 6. Egg weight (g ± SE) of the different ducks and geese studied.

District	Egg weight ± SE (g) and shell colour of different duck/geese types									
	Common duck (187)		Sada Pati Hans (205)		Runner 65)		Muscovy black and white (87)		Muscovy sepia (65)	
	Colour	Weight	Colour	Weight	Colour	Weight	Colour	Weight	Colour	Weight
MID (East)	CLB	55 ± 4.3 ^d	CLB	67.2 ± 4.2	CLB	59.7 ± 0.8	Cream	70.5 ± 2.2 ^a	—	—
N		33		35		65		19		17
MUR	CLB	62.6 ± 4.5 ^b	CLB	68.5 ± 3.7	NR	NR	Cream	71.2 ± 2.1 ^a	Cream	78.2 ± 2.9 ^a
N		28		42				19		18
24 P (S)	CLB	63.7 ± 4.0 ^b	CLB	67.2 ± 3.4	NR	NR	Cream	70.6 ± 1.2 ^a	Cream	75.3 ± 1.8 ^b
N		43		49				15		17
24 P (N)	CLB	65.4 ± 4.6 ^a	CLB	68.55 ± 1.3	NR	NR	Cream	69.1 ± 1.4 ^a	Cream	75.8 ± 1.6 ^b
N		41		34				15		15
NAD	CLB	59.7 ± 3.5 ^c	CLB	67.3 ± 2.7	NR	NR	Cream	67.8 ± 2.1 ^b	Cream	74.7 ± 1.3 ^b
N		42		45				19		20
Average		61.3 ± 4.2		67.75 ± 3.1		59.7 ± 0.8		69.8 ± 1.8		76.3 ± 1.8

a,b,c,d Values with different subscripts across columns differ significantly, P < 0.05, CLB = Cream to bluish, CW = Cream to white. N indicates numbers of eggs weighed.

replaced by white feather as they mature. The drakes are identified by the upward curving of feather near the back of the drake. These ducks like to move in flock and because of their characteristic white feather are easily identified. The result from Table 3 indicates that the population of the drakes was highest in MUR, while that of the duck was highest in 24 P (S). The ducks also gain good body weight and hence fetch higher price in the markets in comparison with the other duck types.

The results from Table 4 also indicates that the highest body weight among the drakes and ducks were observed in those reared in NAD, while the lowest were observed in 24 P (N) and MUR. The average body weight is higher than the values reported by Bhuiyan *et al.* (2005) and lower than those reported by ILRI (2004). The differences as observed in the study may be because the former researchers assessed the body weight at 9 weeks of age when the ducks are yet to mature and the later reported the values from farm reared ducks which were provided with balanced ration and management. It has been observed that the average age at first laying is around 135.5 ± 18.5 days; the results are lower than the values reported by Hoque *et al.* (2001) and Islam *et al.* (2003) for desi ducks of Bangladesh, but in consonance with the reports of ILRI (2004) for desi white duck of Bangladesh. The sada pati hans lay an average of 130 eggs in a year and hence are preferred by the rearers as a layer breed. The average annual numbers of eggs obtained per duck (Table 5) is higher than those of the native ducks and find similarity with the observations of Hoque *et al.* (2010), among the study areas the largest number of eggs were observed in NAD, while the least numbers of eggs were reported from the studied villages in 24 P (N). The average weight of the eggs (Table 6) find similarity with the values as reported by ILRI (2004), no differences among the studied locations were observed for the trait. The study also showed that the skin colour is yellow to white, the average dressing percentage as obtained in the study (Table 7) is lower than those reported by Ansary *et al.* (2008).

Runner

The coloured runner ducks were quite common in the study area prior to 1960s when there was a severe outbreak of duck plague and most of the ducks perished. However, ducks resembling runners with very good egg-laying potential was still reared in some villages in MID (East) district (Figure 5). The revival programme of the runner duck was initiated by Mr Sadesh Ranjan Bhowmick of Mahishadal (LIFE, 2010), a connoisseur of livestock with poultry who was able to obtain a small flock of runner type ducks in 2002 from an obscure village in MID (East) district, he collected a few drakes and ducks one of which was said to be quite old and was still laying eggs. He then went for phenotypic selection of the ducklings obtained from the mating of the collected ducks. He was successful in developing a small flock of the runner ducks which he