

[003] 九州大学農学部農場年報 : 第3号

<https://doi.org/10.15017/13213>

出版情報 : 九州大学農学部農場年報. 3, 2002-03. 九州大学農学部附属農場
バージョン :
権利関係 :

IV. 研究

1. 研究課題

当農場では教官、技官一体となり種々の研究に取り組むとともに、学内外の研究者との共同研究にも力を注いでいる。以下に1998～1999年度に実施した主要な研究課題を示した。

農場教官、技官による研究

- ダイズ遺伝資源の保存と評価（作物・機械研究室、1998-1999）
- 水田転換作物の生産技術に関する研究（同、1998-1999）
- ダイズにおける通気組織系の発達と機能（同、1998-1999）
- 再生二期作稲の栽培技術に関する研究（同、1998）
- 浮稲における節間伸長能力の多様性とその制御機構の解明（同、1999）
- 青刈り再生を利用した飼料稲栽培技術の開発（同、1999）
- 次世代農機のヒューマンインタフェースに関する基礎研究（作物・機械研究室、1998-1999）
- 環境保全型機械化栽培に関する研究（同、1998-1999）
- 農業用多目的統合制御システムの開発に関する研究（同、1998-1999）
- 環境保全型農業に適応する減圧油温乾燥処理新素材の開発と利用に関する研究（同、1998-1999）
- ユリ属植物の生態適応と種分化（蔬菜・花卉研究室、1998-1999）
- 熱帯性豆類、シカクマメの育種に関する研究（蔬菜・花卉研究室、1998）
- 微生物入り有機肥料の活用による環境保全型園芸生産技術の確立（蔬菜・花卉研究室、1998-1999）
- 乳を用いた受動免疫によるう蝕予防（畜産研究室、1998-1999）
- トカラヤギの繁殖および遺伝について（畜産研究室、1998-1999）
- 久連子鶏の遺伝について（畜産研究室、1998-1999）
- 全国大学附属農場の共同研究テーマ「畑地および樹園地における雑草の生態調査」（畜産研究室、1999）
- 浮稲の飼料化（畜産研究室、1998-1999）
- トカラヤギの採食時の闘争行動の緩和について（畜産研究室、1998）
- トカラヤギの発情発現に対する社会順位の影響（畜産研究室、1999）
- 一産取肥育牛の増体および肉質に関する研究（動物生産部門、1998～1999）
- 肥育牛の肉質早期判定技術の確立に関する研究（動物生産部門、1998～1999）
- 育成期の飼料給与体系の差異が黒毛和牛骨格筋の発達に及ぼす影響（動物生産部門、1998～1999）
- 牛の分娩時刻予測に関する研究（動物生産部門、1998～1999）
- 追播における覆土が牧草およびエゾノギシギシの発芽に及ぼす影響（動物生産部門、1998～1999）
- 周年放牧における黒毛和牛の自然分娩に関する研究（動物生産部門、1998～1999）
- 黒毛和種雌牛の繁殖成績に及ぼすビタミン含有製剤の影響（動物生産部門、1998～1999）
- 離乳法の違いが子牛の生育に及ぼす影響（動物生産部門、1998～1999）
- 給餌における質の変化が和牛の成長ホルモン分泌パターンに及ぼす影響（動物生産部門、1998～1999）

学部教官による研究（農場教官との共同研究を含む）

環境保全型機械化栽培に関する研究（農業機械学講座、農産機械工学講座、1998-1999）

環境保全型農業に適応する減圧油温乾燥処理新素材の開発と利用に関する研究（農業工学科、生物環境調節研究センター、1998-1999）

学外研究者による利用（農場教官との共同研究を含む）

農業用電気機械の開発に関する研究（九州電力(株)総合研究所、1998）

2. 研究業績

学会誌（論文抄録）

1998年度

MOCHIZUKI, T., *et al.* Elongation ability of African floating rice (*Oryza glaberrima* Steud.). *Plant Production Science* 1:134-135.

The elongation ability of African floating rice was examined using the standard scoring system, that is the total plant length or total internode length of a plant is compared with that of the standard varieties after a stepwise increase in water depth starting on the 30th day after sowing. As a result, the 40 African floating rice varieties used were classified into three groups according to the total plant length. Twenty five varieties used (ca. 63%) had a total plant length equal to or longer than Habiganj Aman VIII (group 1), 11 varieties (ca. 28%) between Habiganj Aman VIII and T442-57 (group 2) and 4 varieties (10%) shorter than T442-57 (group 3). All of the African floating rice varieties examined were longer than D7. In all groups, the longer the total plant length, the larger the number of elongated internodes ($r=0.883^{**}$), and the longer the total internode length ($r=0.932^{**}$). A high positive correlation was observed between the number of elongated internodes and the total internode length ($r=0.924^{**}$). The LEI position ranged from the 8th to 11th internode, and a negative correlation was observed between the LEI position and total plant length ($r=-0.736^{**}$); the lower the LEI position, the longer the total plant length. In conclusion, most of the African floating rice varieties seem to have nearly the same elongation ability as that of Habiganj Aman VIII, which, so far we found, has the highest elongation ability among Asian floating rices. It is also suggested that the elongation ability of African floating rices can be estimated by the LEI position, like that of Asian floating rices, because the lower the LEI position, the longer the total plant length, under submerged conditions.

(Park, S. M.), M. Hiramatsu and A. Wakana. Aneuploid plants derived from crosses with triploid grapes through immature seed culture and subsequent embryo culture. 1999. *Plant Cell, Tissue and Organ Culture*, 59: 125-133.

Through immature seed culture and subsequent embryo culture, aneuploid plants were derived from various crosses among 184 different triploid hybrid grape vines. In self-pollinations of the 184 vines, 0 to 1.6% of flowers produced immature seeds. In 16 reciprocal crosses between diploid and triploid and between tetraploid and triploid grapes, 0 to 23.0% of flowers produced immature seeds. The immature seeds excised 30-50 days after pollination were cultured for three months on Nitsch and Nitsch medium supplemented with L-glutamine, L-serine, L-cysteine and casein hydrolysate. Embryos developed within the cultured immature seeds were subcultured onto germination medium consisting of MS medium with 1μ MBA. Thirty-four of 137 embryos from 458 imma-

ture seeds germinated. Five of the 34 embryos grew normally. The five recovered plants were aneuploids with chromosome numbers from 51 to 59. The rates of embryo and plant recovery were different in different crosses with triploid grapes.

(T. H. Elsasser) , Y. Ono *et al.* Effects of Synovex-S® and Recombinant Bovine Growth (Somavubove®) on Growth Responses of Steers: III. Muscle Growth and Protein Responses.

We conducted this study to determine whether the growth responses of specific skeletal muscles in crossbred beef steers were differentially affected by treatment with recombinant bovine growth hormone (Somavubove®, SbV, .1 mg/kg BW, i.m., daily), Synovex-s® (200 mg progesterone + 20 mg 17- β estradiol benzoate, SYN, ear implant), or a combination of the two. Starting body weights of steers averaged 182 ± 1.8 kg. Five steers were used at this average BW to obtain data on weight and composition of individual muscles at d 0, and 20 other steers were assigned in equal numbers to control (C, no implant and placebo daily injection), SYN, SbV, and SYN + SbV treatment groups. After 56 d of treatment with placebo or growth promoters, complete rectus femoris (RF) , triceps brachii (TB) , supraspinatus (SS), psoas major (PM), and semiten-dinosus (ST) muscles were dissected, weighed, and then ground for determination of moisture, total protein, and fat. To calculate the average daily muscle wet weight, protein, and fat gains, the initial weight, protein content, and fat content of a muscle were subtracted from those obtained at slaughter and the difference divided by 56. Muscle weight was increased over C in TB and SS by SYN ($P < .1$); in TB by SbV ($P < .09$); and in RF ($P < .05$), TB ($P < .03$), and SS ($P < .03$) by SYN + SbV. Overall average daily wet tissue gain was increased over C by SbV + SYN ($P < .05$) in RF, TB, and SS. Average daily protein gain in RF and TB was increased by SYN ($P < .1$), SbV ($P < .06$), and SYN + SbV ($P < .01$) over that calculated for C. For RF, TB, and SS, average daily protein gain was greater ($P < .1$) in SbV + SYN than that obtained with SbV or SYN alone. These data suggest that administration of growth promoters, such as somatotropin and Synovex, to cattle differentially affects growth characteristics in certain muscles and can have additive effects on protein gain when used together.

(H. IWAMOTO), Y. ONO, *et al.* Effects of parent Shamo cocks on the histochemical properties of *M. iliotibialis lateralis* and *M. supracoracoideus* on their crossbred broilers. British Poultry Science (1998) 39: 589-595

1. Four Shamo (a Japanese game bird) cocks showing different characteristics in the histochemical properties of *M. iliotibialis lateralis* (ITL) were crossed with White Rock hens to produce male and female crossbred broilers of the 4 lines (90 d of age). Normal broilers (56 d) were used, for comparison.

2. Histochemical properties of ITL and *M. supracoracoideus* (SC) were compared among the crossbred Imes and normal broilers. Myofibres were divided into Types II R, II I and II W showing high, moderate and low reduced nicotinamide adenine dinucleotide dehydrogenase (NADH-DH) activities, respectively.

3. In the ITL of the crossbred cockerels, the percentage of Type II R and II I fibres decreased and conversely Type II W increased in comparison to those in the Shamo.

4. Sex differences of the histochemical properties were recognised only in the ITL of the crossbred, in which the percentage of Type II R fibres was greater in the male.

5. The different characteristics of the parent Shamo cocks were reproduced only in the different fibre type composition of the ITL muscle in the crossbred cockerels.

6. The histochemical features of fibre type seemed to develop with bird age, particularly subsarcolemmal accumulation of fonnazan granules (indicating high NADH-DH activity) in Type IIR fibres.

7. Breed, line, sex and age differences in the histochemical properties were demonstrated clearly in ITL but not in

SC.

(Takashi Bungo), Yutaka Nakano, Kaoru Okano, *et al.* Relationship between nursing and suckling behaviour in Tokara native goats. *Applied Animal Behaviour Science* 59 (1998) 357-362

Data on suckling behaviour in Tokara native goats were collected from six mother-kid pairs which were reared separately. Each pair was observed for suckling bouts (the duration of time which kid pulled at or was in contact with the udder) and rejection of nursing (mother did not permit kid to suckle) from one week to nine weeks of age, and data were collected once every second week. The following results were obtained. There was a large reduction both in the suckling duration per bout and in the suckling duration per hour from the 1st to 3rd week. The rejection rate had a large increase from the 1st to 3rd week. There were large changes in them in the 1st to 3rd weeks. In the frequency of access to udder, there were reductions between the 1st to 3rd weeks and the 7th to 9th weeks and between the 1st to 5th weeks and the 9th week. It is suggested that the suckling period between the 1st and 7th weeks is a critical period for the relationship between mother and her offspring in Tokara native goats. For weaning, not only suckling behaviour but also rejection of nursing must be taken into account.

尾野喜孝ほか6名. 家鴨類骨格筋の発達と組織化学的特性に及ぼす水田放飼の影響と品種差. 家禽会誌, 35:367-375. 1998

合鴨水田農法に適した家鴨類の選定のための基礎研究の一環として, 国内種, IR種および中国種の胸筋と外側腸脛骨筋の発達と筋線維の特性について放飼区と舎飼区との間および品種間での比較検討を行った. 放飼区は, 4aの水田に, 田植え1週間後に12日輪の雛を雌雄3羽ずつ72日間放飼した後, 63日間配合飼料で舎飼いした. 舎飼区は, 面積12aの建物内で, それぞれの品種の雌雄3羽ずつを配合飼料で飼育した. 屠殺は21週齢時に行った. 得られた結果を以下に示す.

1. 体重および胸筋と外側腸脛骨筋重量は, いずれの品種も放飼区と舎飼区の間では差がなかったが, 品種差を示し, 体重は中国種で最も大きく, IR種がこれに続き, 国内種が最小であった. 胸筋の発達は国内種で最も優れ, 外側腸脛骨筋はIR種で優れていた.

2. 胸筋と外側腸脛骨筋を構成する筋線維はすべて速筋線維であるⅢ型に分類され, それらはさらに酸化的酵素活性の高いⅡA型と低いⅡB型に細分された. 胸筋は約70%のⅡA型と30%のⅡB型で構成され, 外側腸脛骨筋は約40%のⅡA型と60%のⅡB型で構成されていた. 中国種の舎飼区は放飼区に比較し, 外側腸脛骨筋の各型筋線維の構成割合において, ⅡA型が多く, ⅡB型で少なかった. 品種間で比較した場合, 胸筋では国内種でⅡA型が多く, ⅡB型が少なかった. 一方, 外側腸脛骨筋ではIR種でⅡA型が多く, ⅡB型が少なかった.

3. 筋線維直径は両筋肉ともⅡB型でⅡA型より大きかった. 品種間では, 胸筋のⅡB型が国内種とIR種で大きく, 外側腸脛骨筋ではⅡA型およびⅡB型ともIR種と中国種で大きかった.

4. これらの結果から, 家鴨類にとって放飼と舎飼いの飼養形態の違いによる筋肉発達への影響は小さいことが示唆されるとともに, 国内種は飛翔能力に, IR種は陸上での走歩行に, また中国種は産内性ですぐれる特徴のあることが推察された.

1999年度

(S. Morita), Y. Ono. *et al.* Heterogeneous composition of histochemical fibre different parts of *M. longissimus thoracis* from (Japanese native) steers. *Meat Science* 54 (2000) 59-63

In Mishima (Japanese native) steers, histochemical properties of *m. longissimus thoracis* were examined at 3 parts: on the level of 6th thoracic (LT I), 11th thoracic (LT II) and 5th lumbar vertebra (LT III). Myofibres were categorized into Type I, II A and II B. The same fibre type composition (I, 37%, II A, 17%, II B, 46%) was observed at

LT I and LT III and another (I, 26%, II A, 15%, II B, 59%) at LT II. At each part apparent regional differences of fibre type composition could not be demonstrated except for Type I between medial and lateral subpart at LT I and Type II A between central and lateral at LT III because of its marked variation among the individual steers. Relative fibre diameter of Type I to Type II A in the combined data was large at LT I and LT III. Type II B fibres showed larger diameter than Type I only at LT III. From these results it was suggested that Mishima steers have maintained another histochemical property of the longissimus muscle differing from that of Japanese Black steers (Gotoh, Iwamoto, Ono, Nishimura, Matsuo, Nakanishi, Umetsu & Takahara, (1994). Comparative study on the regional composition of fiber types in *M. Longissimus thoracis* with different marbling scores for Japanese Black steers. *Animal Science and Technology*, 65, 451-463).

(Takafumi GOTOH), Raizaburo UMETSU and Yoshitaka ONO *et al.* Myofiber Type Distribution in the Cranial Portion of *M. biceps femoris* of Japanese Black Young Steers. *Animal Science Journal* 70 (6) : 510-518,

Abstract Histochemical properties of *M. biceps femoris* were examined in Japanese Black young steers (11 months of age). The cranial portion of *M. biceps femoris* was dissected out from *M. gluteobiceps* after measuring its weight and was divided into 3 parts of equal length, namely the proximal, middle and distal. At the center of each part, the muscles were collected from the 5 subparts of equal depth from the superficial to the profound. Using the histochemical reactions for myosin ATPase and reduced nicotinamide adenine dinucleotide dehydrogenase, myofibers were categorized into Type I, Type II A and Type II B. Different distributions of myofiber types among the parts were also recognized in these young steers showing the same tendency as in the fattened adult in our previous study. However, Type II A myofibers occurred at higher percentage in the young than in the adult in every parts and Type I and Type II B showed the reverse tendency except for Type II B in the proximal part. These results indicated that the biceps muscle underwent a change in the myofiber type composition with transformation of Type II A to Type I and Type II B from 11 to 29 months of age.

(Hisao IWAMOTO), Yoshitaka ONO *et al.* Inter- and Intra-breed Variation in the Fiber Type Composition of *M. longissimus lumborum* and *M. biceps femoris* in Japanese Black, Japanese Brown, Holstein and F₁ (Japanese Black × Holstein) Steers. *Animal Science Journal* 70 (6) : 490-496.

Inter- and intra-breed variation in the fiber type composition of *M. longissimus lumborum* and *M. biceps femoris* in steers was examined on the biopsy materials. Fibers were divided into Type β R, α R and α W. Japanese Black (born in Ohita and Kagoshima prefecture) and Japanese Brown (ASO and Kikuchi, Kumamoto prefecture), Holstein and F₁ (Japanese Black bull X Holstein cow) steers were used. In both muscles, the marked inter- and intra-breed variation was observed on the percentages of Type β R and α W fibers with those reciprocal changes. Of all breeds, the Ohita-Black showed the largest percentage of Type β R fibers and the Kagoshima-Black the second in each muscle. On the other hand, the muscles of the Holstein were characterized by containing Type β R fibers at the lowest frequency. The Brown occupied middle position between the Blacks and Holstein in the percentage distribution of Type β R fibers and showed the largest percentage of Type α R fibers in the biceps muscle compared with the others. From these results it was suggested that the Japanese natives substantially differ in their fiber type composition in the muscles from those of the Holstein and also exhibit inter- and intra-breed variation.

(Takafumi GOTOH), Raizaburo UMETSU, Yoshitaka ONO, *et al.* Histochemical Properties of Skeletal Muscles in Different Body Parts of Young Japanese Black Steers. *Animal Science Journal* 70 (6):497-509.

Abstract Histochemical examination was carried out on the 66 skeletal muscles in the different body parts of the young Japanese Black steers (11 months of age). Tissues were taken from the central portion of each muscle, cut into serial frozen sections and stained by reactions for myosin ATPase and NADH dehydrogenase activities. Myofibers were divided into Type I, IIA and IIB. Generally the muscles in the young steers contained Type IIA myofibers at higher frequency as compared with the fattened adult. Some Type IIA myofibers seemed to transform into Type I or Type IIB with age. The muscles with much Type I myofibers which are to play a main role in posture maintaining were very small and occupied the deep position, but *Mm. serratus ventrales* is fairly large. The large muscles important for beef production contained great proportion of Type II myofibers, which are mobilized to do more active motions such as locomotion. These results suggest that every muscle plays its peculiar function at different body parts after obtaining its own histochemical property.

(Bungo Takashi), Nakano Yutaka, Okano Kaoru, *et al.* Relationship Between Suckling Behaviour and Locomotor Play Behaviour in Housed Goats of Early Age. *J. L. H. E.*, 5(1) 23-28, 1999

Data on suckling and play behaviour in Tokara native goats was collected from seven mother-kid pairs. Each pair was housed together and respective pairs were reared separately. Each kid was observed for locomotor play bouts (leaping and running) and suckling (suckling time and frequency of udder accesses) at the age of 1 week. The kids were divided into two groups according to high-rate and low-rate performance for suckling time, and these two groups were compared with respect to locomotor play behaviour. The results show that high-rate performance of suckling behaviour were more active in leaping and total locomotor play than low-rate performance and the difference was significant ($P < 0.05$). It was suggested that high activity in suckling behaviour in kids would be necessary for high-performance play behaviour.

(Takashi BUNGO), Yutaka NAKANO, Kaoru OKANO, *et al.* Effect of a barrier in a pen upon the agonistic behaviour of housed Tokara native goats. *Jpn. J. Livest. Management*, 35(2):41 - 45. 1999.

Agonistic behaviour was observed to assess the effects of an artificial barrier on the responses of a group of four Tokara native goats. The animals' behaviour was examined both in the presence and in the absence of the barrier. The frequency of aggressive behaviour significantly decreased after provision of the barrier ($P < 0.05$). The frequency of avoidance seemed to be higher for the group after provision of the barrier than for the group before provision of the barrier, but there was no significant difference ($P > 0.05$). After provision of the barrier, the goats seemed to spend more time standing and moving than they did before provision of the barrier, but for all activities (maintenance behaviour) there was no significant difference ($P > 0.05$). These findings suggest that the provision of a barrier for a pen suppresses physical injury by aggressive behaviour in goats. Key words: Barrier, Agonistic behaviour, Tokara native goat.

(Takashi Bungo), Yutaka Nakano, Kaoru Okano, Hirotoshi Furusawa, Koichi Yasukochi, Takahiro Matsuishi, Kiyotaka Izumi, *et al.* Direction of jaw movement in dairy cattle during the rumination period. *Applied Animal Behaviour Science* 64 (1999) 227-232

Jaw movements in dairy cattle were observed during rumination. The direction of jaw movement was recorded to

determine the frequency in three phases: the first jaw-opening movement (FJM) which serves to keep the major part of the bolus on one side of the oral cavity, main jaw-opening and -closing movements (MJM), from the second movement to the [ultimate one, which serve to repeatedly jumble and grind the bolus, and the last jaw-opening movement (LJM) which serves to prepare the, bolus for swallowing. Five dairy cattle were monitored in trial I to record FJM, MJM and LJM, and 16 cows were monitored in trial 2 to record MJM. It was found that the direction of FJM and MJM during a single rumination period (time spent chewing one bolus) was a one-way movement, either left or right depending on the position of each bolus in the oral cavity (the storage side). However, the direction of MJM was opposite to that of FJM, because in the case of MJM, the jaw-opening activity scattered the bolus, it moved from the storage side in the oral cavity and the jaw-closing activity ground it down while it was being moved from the other side to the storage side. Furthermore, it was found that direction of MJM is not always the same from one rumination period to another. It was suggested from this study that dairy cattle tend to show jaw movement in a constant one-way direction, either left or right, when remasticating most of the boli during a given rumination.

(Park,S.M.),M.Hiramatsu and A.Wakana. Aneuploid plants derived from crosses with triploid grapes through immature seed culture and subsequent embryo culture. *Plant Cell, Tissue and Organ Culture* 59:125-133.

Through immature seed culture and subsequent embryo culture, aneuploid plants were derived from various crosses among 184 different triploid grape vines. In self-pollinations of the 184 vines, 0 to 1.6% of flowers produced immature seeds. The immature seeds excised 30-50 days after pollination were cultured for three months on Nitsch and Nitsch medium supplemented with L-glutamine, L-serine, L-cysteine and casein hydrolysate. Embryos developed within the cultured immature seeds were subcultured onto germination medium consisting of MS medium with 1É M BA. Thirty-four of 137 embryos from 458 immature seeds germinated. Five of the 34 embryos grew normally. The five recovered plants were aneuploids with chromosome numbers from 51 to 59. The rates of embryo and plant recovery were different in different crosses with triploid grapes.

望月俊宏・高橋卯雪・島村聡ほか1名 数種夏作マメ科作物の胚軸における二次通気組織の形成. *日本作物学会紀事* 69:69-73.

ダイズを含む6種の夏作マメ科作物およびツルマメの幼植物を、畑および過湿条件で14日間栽培し、土壌表面直下の胚軸における二次通気組織の形成量を調査した。その結果、二次通気組織は、畑区ではいずれの作物・種の胚軸にもほとんど見られなかったが、過湿区には作物・種間差が認められ、胚軸横断面あたりの二次通気組織の面積は、ダイズ‘アソアオガリ’の9.77mm²以下、ダイズ‘アキセンゴク’7.80mm²、ツルマメ4.37mm²、ササゲ2.63mm²、リョクトウ‘ブンドウマメ’1.97mm²、リョクトウ‘Acc.7703’1.52mm²の順で、他の3作物では1mm²以下であった。中心柱に対する二次通気組織の面積の比も、ダイズはツルマメについて大きく、ダイズにおける二次通気組織の形成能はツルマメと同程度であることが明らかであった。また、地上部乾物重比（畑区に対する過湿区の乾物重の比率）と過湿区における二次通気組織の面積との間には、1%水準で有意な正の相関関係（ $r=0.738$ ）が認められることから、二次通気組織の形成能は、マメ科作物における耐湿性の強弱と関係のあることが示唆された。

(守田智)・尾野喜孝ほか4名. 去勢雄見島牛の大腿二頭節前部における鋼線維型の分布の差異. *日本畜産学会報*, 70(9):J177-J183, 1999

見島牛去勢雄を用いて、大腿二頭筋前部における筋線維型構成を明らかにした。殿二頭筋から大腿二

頭筋前部を切り出し、近位、中位および遠位部に六割し、さらにそれぞれを浅層から深層の方向に5等分し、合計15個の材料肉片を得た。凍結切片を作製し、組織化学的に筋線維を βR 、 αK および αW 型に分類した。遠位部で浅層と深層に筋線維型の分布に差が認められ、最深層部で βK 型筋線維が少なく、 αW 型筋線維が多い傾向が示された。大割部位間では、近位部が他とは異なる筋線維型構成を示し、 βR 型筋線維の割合が明らかに大きく、 αW 型筋線維の割合が小さかった。見高牛では βR 型筋線維で他の型に対する相対的直径が明らかに大きかった。

尾野喜孝・衛藤哲次・内田哲郎・西村光博ほか3名. 黒毛利種雌一産取肥育牛の発育特性に関する研究. 西日本畜産学会報42, 5~11, 1999

一産取肥育牛(一産取牛)の発育特性を明確にするために、体重、体高、体長、胸囲、腹囲、肩幅(上腕骨大結節間幅)、胸幅および寛幅の発育、ならびに相対成長式を用いて体重と他の7測定項目との間での発育の相互関係について一産取牛、未経産成月目育牛(未経度牛)および若齢肥育牛(若齢牛)の3試験区間での比較検討を行った。一産取牛と未経度牛の肥育期間は5ヵ月とした。若齢牛は10ヶ月齢から25ヶ月齢まで肥育を行ったが、本研究では屠殺前5ヶ月間のデータを用いた。一産取牛と未経度牛は肥育開始体重では若齢牛よりも小さかったが、肥育終了体重では逆に若齢牛より大きな値を示すようになった。この間の平均DGは一産取牛で1.33kg、未経度牛で1.06kgおよび若齢牛で0.49kgであった。この肥育による体重の増大に及ぼす要因は試験区間で異なっており、一産取牛と未経度牛では胸囲、腹囲、肩幅、胸幅および寛幅の発育に基づいていたが、若齢牛では胸囲、腹囲および胸幅の発育に基づくものであった。体高と体長はいずれの試験区でも体重の増大には寄与していなかった。以上の結果から、一産取肥育牛は体幅の増大に基づく著しい増体を示し、5ヶ月間の肥育によって十分な肥育終了体重に達し得ることが示唆された。

尾野喜孝・衛藤哲次・内田哲郎・西村光博ほか3名. 黒毛利種雌一産取肥育牛の枝肉特性に関する研究. 西日本畜産学会報42, 23~27, 1999

一産取牛の枝肉生産性および肉質を明らかにするために、黒毛利種を用いて一産取肥育牛、未経産成肥育牛(未経度牛)および若齢肥育牛(若齢牛)の3試験区間で屠殺前体重、枝肉重量および枝肉評価項目についての比較検討を行った。肥育期間は一産取牛と未経度牛でそれぞれ32および30ヶ月齢より5ヶ月間とし、若齢牛は10ヶ月齢より15ヶ月間とした。屠殺前体重は一産取牛と未経度牛で若齢牛よりも有意に大きかった($P < 0.05$)が、枝肉重量と枝肉歩留まり値に関しては試験区間に有意な差を認めなかった。ロース芯面積、バラの厚さおよび皮下脂肪厚でも試験区間に有意差は認められず、いずれの試験区ともほとんど等しい歩留まり等級を示す結果となった。また、枝肉等級に関する各項目も各試験区間での有意差を示さず、これら項目から総合的に評価される肉質等級平均値は一産取牛で2.5、未経度牛で2.0および若齢牛で2.7となり、試験区間で有意な差を示さなかった。以上のように、一産取牛は5ヶ月間の肥育で、15ヶ月間肥育を行った若齢牛と遜色のない枝肉量と肉質の生産を期待できるものと考えられた。

国際会議などのプロシーディングス

1998年度

Wakana, A., X.B. Ngo *et al.* Self-incompatibility in Citrus: Linkage between GOT isozyme loci and the incompatibility loci. Proceedings of the 2nd Japan-Australia International Workshop (Breeding and Biotechnology for Fruit Trees):90-93.

1999年度

- Nakaji, K. and J. Liu. Voice manipulation of agricultural machinery and facilities, ASAE Paper No.993052.
- Yoshitaka Ono, *et al.* Comparative study on the myofiber type composition and the fat deposit in *M. longissimus thoracis* between young heifer groups of Japanese black fed freely on concentrate and roughage. (The 45th International Congress of Meat Science and Technology. Proceedings 1:278-279, 1999)
- Yoshitaka Ono, *et al.* Heterogeneous composition of histochemical fiber types in the different parts of *M. longissimus thoracis* from Mishima (a Japanese native) steers. (The 45th International Congress of Meat Science and Technology. Proceedings 1:278-279, 1999)

学報, 農場報告など

1998年度

- (Masataka Shimojo), Yutaka Nakano, *et al.* Use of Complex Number in the Analysis of Increase in Dry Matter Indigestibility with Growth of Forages. *J. Fac. Agr., Kyushu Univ.*, 43 (1•2), 137-142 (1998)
- (Masataka Shimojo), Yutaka Nakano, *et al.* An Application of Growth Analysis Method to Simple Correlation Analysis between Dry Matter Indigestibility and Lignin Content with Growth of a Forage. *J. Fac. Agr., Kyushu Univ.*, 43 (1•2), 127-136 (1998)
- (Masataka Shimojo), Yutaka Nakano, *et al.* Accumulation Rate of Digestible Materials and Formation Rate of Indigestible Materials in the Description of Relative Growth Rate of Forages. *J. Fac. Agr., Kyushu Univ.*, 43 (1•2), 119-126 (1998)
- (Masataka Shimojo), Yutaka Nakano, *et al.* Mean Leaf Area of the Canopy for Light Interception by Forages and Mean Retention Time of Feed in the Rumen for Feed Ingestion by Ruminants as Investigated using Simple Models. *J. Fac. Agr., Kyushu Univ.*, 43 (1•2), 11-18 (1998)
- (Masataka Shimojo), Yutaka Nakano, *et al.* A Hypothetic Equation from Which Growth Analysis Equations of Forages and Ruminants are Derived as Special Cases. *J. Fac. Agr., Kyushu Univ.*, 43 (1•2), 103-109 (1998)
- (Masataka Shimojo), Yutaka Nakano, *et al.* Analyses of Accumulation of Crude Protein and Decrease in its Content in the Growth of *Chloris gayana* Kunth and *Desmodium intortum* (Mill.) Urb. *J. Fac. Agr., Kyushu Univ.*, 42 (3•4), 377-381 (1998)
- (Masataka Shimojo), Yutaka Nakano, *et al.* Two Different-Type Equations Analyzing Decrease in Dry Matter Digestibility with Growth of Forages. *J. Fac. Agr., Kyushu Univ.*, 42 (3•4), 373-376 (1998)
- (Masataka Shimojo), Yutaka Nakano, *et al.* Accumulation of Digestible Materials and Decrease in Dry Matter Digestibility in the Growth of Two Tropical Grasses. *J. Fac. Agr., Kyushu Univ.*, 42 (3•4), 365-372 (1998)
- (Masataka Shimojo), Yutaka Nakano, *et al.* Relationship between Two Different-Type Equations Analyzing Increase in Dry Matter Indigestibility with Growth of Forages. *J. Fac. Agr., Kyushu Univ.*, 42 (3•4), 361-364 (1998)
- (Masataka Shimojo), Yutaka Nakano, *et al.* Formation of Indigestible Materials from Digestible Materials and Photosynthates in the Growth of Rhodes grass (*Chloris gayana* Kunth). *J. Fac. Agr., Kyushu*

Univ., 42 (3・4), 355-360 (1998)

(Masataka Shimojo), Yutaka Nakano, *et al.* An Application of Growth Analysis Method to Simple Correlation Analysis between Dry Matter Indigestibility and Lignin Content with Growth of a Forage. J. Fac. Agr., Kyushu Univ., 43 (1・2), 127-136 (1998)

(鄭 紹輝)・望月俊宏ほか1名 収穫期前の降雨が夏サイズの子実品質に及ぼす影響. 九州大学農学部学芸雑誌 54:1-5.

望月俊宏・梶原良徳・鳥飼芳秀・中川幸夫 再生二期作稲の生育・収量におよぼす施肥量と刈り高さの影響. 九州大学農学部学芸雑誌 54:115-120.

1999年度

(Park,S.M.),A.Wakana and M.Hiramatsu. Mosthypotetraploid seedlings from self-pollinated tetraploid grapes (*Vitis complex*) have abnormal cotyledons. Journal of Faculty of Agriculture, Kyushu University 44:81-89.

(Ozaki, Y.), M. Hiramatsu, K., *et al.* 1998. Application of flow cytometry for rapid determination of ploidy levels in asparagus (*Asparagus officinalis* L.). J. Fac. Agr., Kyushu Univ. 43(1)ÅF83-88.

(Park, S. M.), A. Wakana, and M. Hiramatsu. 1999. Most hypotetraploid seedlings from self-pollinated tetraploid grapes (*Vitis complexes*) have abnormal cotyledons. J. Fac. Agr., Kyushu Univ. 44(1)ÅF81-89.

(Masataka Shimojo), Yutaka Nakano, *et al.* Analyses of Accumulation of Silica in the Growth of Two Tropical Forages using Simple Equations. J. Fac. Agr., Kyushu Univ., 43 (3・4), 395-401 (1999)

(Masataka Shimojo), Yutaka Nakano, *et al.* Forage Growth Analysis, Forage Digestion Analysis and Ruminant Growth Analysis as related using Simple Equations. J. Fac. Agr., Kyushu Univ., 43 (3・4), 383-393 (1999)

(Masataka Shimojo), Yutaka Nakano, *et al.* Accumulation of Digestible Materials with Growth of Forages and Digestion of Forage Dry Matter by *in vitro* Incubation with Rumen Fluid and Pepsin. J. Fac. Agr., Kyushu Univ., 43 (3・4), 373-382 (1999)

(Masataka Shimojo), Yutaka Nakano, *et al.* Net Assimilation Rate of Forages and Forage Intake of Ruminants as Related using a Hypothetic Equation Suggested to Growth Analysis of both Forages and Ruminants. J. Fac. Agr., Kyushu Univ., 43 (3・4), 365-371 (1999)

(Masataka Shimojo), Yutaka Nakano, *et al.* Two Different-Type Equations of Relative Growth Analysis for both Forages and Ruminants and Deriving of them from A Hypothetic Equation. J. Fac. Agr., Kyushu Univ., 43 (3・4), 355-364 (1999)

(内野敏剛)・中司 敬ほか2名 電場水の物理的性質. 九州大学農学部学芸雑誌 54(1・2):61-67.

著書, 雑誌など

1999年度

(Nakazono,S.), K.Nakaji, K.Okano *et al.* Drying of sewage sludge by using wasted edible oil under heating and decompression. Geoenvironmental Engineering, Thomas Telford Ltd, London:551-558.

西村光博 草地維持管理 (2) 一追播草の定着促進一. 畜産の研究 52:18-26, 1998.

口頭発表

1998年度

(Ngo,X.B.),A.Wakana *et al.* Self-incompatibility and segregation distortion for GOT isozymes in Citrus. The Symposium and 1998 Spring Meeting of Jap.Soc.Hort.Sci., 67(1):31.

(Park,S.M.),M.Hiramatus,A.Wakana *et al.* Characteristics of triploid hybrids from reciprocal crosses between diploid and tetraploid grape cultivars. The Symposium and 1998 Spring Meeting of Jap.Soc.Hort.Sci.67(1):66.

若菜章・ノースンビン・花田信章・福留功 九州に散在するブタン古木のGOTアイソザイム変異. 園芸学会九州支部研究収録6:1-2.

ノースンビン・若菜章ほか1名 自家受粉および制限受粉によるカンキツの自家不和合性および半自家和合性品種の調査. 園芸学会九州支部研究収録:3-4.

(朴成敏)・若菜章ほか1名 三倍体と二倍体および三倍体と四倍体のブドウを交配して得られた異数成種子の発達. 園芸学会九州支部研究収録6:67-68.

中司 敬ほか2名 高度制御技術による生態系調和型稲作に関する研究(第1報)ー雑草防除のためのジャンボタニシの行動実験システムー. 農業機械学会.

中司 敬ほか1名 二輪車走行操舵シミュレーション用ソフトウェアの開発. 農業機械学会九州支部.

望月俊宏・梶原良徳・鳥飼芳秀・中川幸夫 1998. 再生二期作稲の生育・収量におよぼす施肥量と刈り高さの影響. 日本作物学会紀事 67 (別号 1):152-153.

中野 豊 イチビを中心とするトウモロコシ畑雑草に対する除草剤の効果 第53会九州雑草研究会,1998

1999年度

Nakaji,K. and J.Liu. Voice manipulation of agricultural machinery and facilities. ASAE/CSAE International Meeting, Toronto.

(Nakazono,S.), K.Nakaji, K.Okano *et al.* Drying of sewage sludge by using wasted edible oil under heating and decompression. 2nd BGS Geoenvironmental Engineering Conference, London.

中司 敬ほか2名 生物生産分野における汎用音声制御実験システム(第1報). 農業機械学会.
ノースンビン・若菜章 自家不和合性カンキツの花柱における花粉管の行動. 園芸学会九州支部研究収録7:24.

若菜章・花田信章・福留功 カラタチに出現する黄色実生の特徴と遺伝. 園芸学会九州支部研究収録7:25.

(朴成敏)・若菜章ほか1名 三倍体を種子親にしたカンキツ異数体, 特にトリソミック個体の作出. 園芸学会雑誌 68(別冊 1):69.

ノースンビン・若菜章ほか1名 GOTアイソザイムのひずみ分離をもとにしたカンキツ品種の自家不和合性遺伝子型の推定. 園芸学会雑誌 68(別冊 2):95.

(朴成敏)・若菜章・比良松道一ほか1名 三倍体に二倍体または四倍体ブドウを交配して得られた異数体雑種実生の染色体数の頻度. 園芸学会雑誌 68(別冊 2):176.

望月俊宏・高橋卯雪・島村聡ほか1名 数種マメ科作物の胚軸における二次通気組織の形成の種間差異. 日本作物学会紀事 68 (別号 1):166-167.

- 島村 聡・望月俊宏・高橋卯雪・福山正隆 ダイズとツルマメの胚軸における二次通気組織の発達. 日本作物学会紀事 68 (別号 1):168-169.
- (下條雅敬)・中野 豊ほか6名 牧草の生長解析と反芻家畜の成長解析 第95会畜産学会大会演
要旨, 49, 1999
- 岡野 香・中野 豊・川越寛子・福山正隆・古澤弘敏・松石貴裕・安河内幸一・泉 清隆ほか4
名 齧(う)蝕抗原投与前後の乳牛の維持行動 第95会畜産学会大会講演要旨, 12, 1999
- 中野 豊・岡野 香・川越寛子・福山正隆・古澤弘敏・松石貴裕・安河内幸一・泉 清隆ほか4
名 齧(う)蝕抗原投与が乳牛の健康に及ぼす影響 第95会畜産学会大会講演要旨, 12,
1999
- 川越寛子・古澤弘敏・岡野 香・中野 豊・福山正隆ほか4名 ヤギ乳による坑う蝕(虫歯)菌
抗体の生産 第95会畜産学会大会講演要旨, 99, 1999
- (飛佐 学)・岡野 香・中野 豊・古瀬充宏・増田泰久ほか3名 暖地型マメ科牧草 *Aeschynomene*
属牧草の生育に伴う地上部粗タンパク質含量の推移 西日本畜産学会報第50回大会号, 12,
1999
- (飛佐 学)・岡野 香・中野 豊ほか3名 *Aeschynomene* 属牧草の成育に伴う地上部不消化物の
推移 第96会畜産学会大会講演要旨, 39, 1999
- 衛藤哲次ほか3名 黒毛和種雌牛の繁殖成績に及ぼすビタミン含有製剤の影響, 西畜学会報 第
50回大会号: 47, 1999
- 衛藤哲次ほか6名 黒毛和種雌一産取り肥育牛の産肉性に関する研究, 第6回九州五大学畜産学
研究会講演要旨, 11, 1999
- (池田堅太郎)・西村光博・尾野喜孝ほか2名 九州中部高原地域の草地土壌における発芽可能な
1年生イネ科草種子数の季節変化, 西畜学会報 第50回大会号: 15, 1999

調査研究報告

1999年度

中司 敬 農業用電気機械の開発に関する研究 平成10年度共同研究報告書

望月俊宏 ツルマメを用いた耐湿性ダイズの作出に関する基礎研究. 文部省科学研究費補助金
「基盤研究(C)」研究成果報告書. 1-16.

望月俊宏 田圃で作るダイズ. 九大研究紹介 p. 59-60, 2000.