

33.2%), the number of embryos still alive after a fortnight of gestation (8.3 vs 5.9) and implantation and survival defects calculated for a constant number of corpora lutea (-1 vs -1.4 and -1 vs -1.5). Receptive does produced three times as many live embryos at mid-term as non receptive does did (6.2 vs 2.1). The physiological stage affected the ovulation frequency, *post partum* lactating does ovulated less frequently (55.7 %) than non-lactating does or 11-days *post partum* lactating does (83.5 and 76.5 %, respectively). The physiological stage also affected to a lesser extend the number of corpora lutea (9.1, 10.4 and 10.1, respectively in the same order). The number of live embryos per doe at mid-term was higher among non lactating does (5.3) than among lactating does (*post partum* : 3.6; 11 days : 4.0). This study confirms that lactation and reproduction are partly antagonistic, as demonstrated here on frequency and intensity of ovulation.

GENETICS

27 - BRUN J.M., LEBAS F.*

Preliminary study on the interactions of sire and feed composition on the reproductive performance of breeding does

6èmes Journées de la Recherche Cunicole en France, INRA-ITAVI, La Rochelle 6-7 déc. 1994, 195-202.

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The breeding performance of 215 rabbit does obtained from 15 males of the 2066 line mated with line 1077 does, were measured during one year. These does were fed isoenergetic diets containing 14.9% (B) or 21.6% (H) crude protein on dry matter basis. The aim of the authors was to determine if the diet's protein level influence the classification of the 15 males according to their daughter's breeding performance and/or the magnitude of the differences between males. The diet did not influence significantly the number of young per litter at birth or at weaning. With diet H, the individual weaning weight (at 29 d.) was increased by 8.2%, the litter weaning weight by 6.5%, and the interval between 2 litters was 3 days shorter. But in one year of production, 438 litters were weaned with diet B and only 354 with diet H for the same initial number of does. A sire significant effect was observed on all of the measured parameters. A significant interaction with the diet's protein level was also observed. Particularly, the dispersion of the sire means was wider with diet H than with diet B, for all parameters but the individual weaning weight. The sire part of the variance of the doe performance was near zero with diet B but 5.6 to 10% of the total variance, according to the trait, with diet H.

28 - BRUN J.M., SALEIL G.

On-farm estimation of heterosis on reproductive performances between INRA A2066 and A1077 rabbit strains

6èmes Journées de la Recherche Cunicole en France, INRA-ITAVI, La Rochelle 6-7 déc. 1994, 203-210.

INRA - Station d'Amélioration Génétique des Animaux, BP 27, 31326 Castanet Tolosan cedex (France)

Since 1974, the "Station d'Amélioration Génétique des Animaux" has been selecting two rabbit strains, the A2066 (from Californian breed) and A1077 (from New-Zealand breed) on their litter size. These strains are used in crossbreeding to produce the 1067 female which is distributed in commercial production farms. We have studied the reproductive performance of four genotypes (A2066, A1077, A1067 and A1076), in six farms. There was a significant favourable influence of female genotypes A1067 and A1076 on litter sizes : for total number of young rabbits born, number of young rabbits born alive, and number of young rabbits weaned, heterosis was 1.3, 1.5 and 0.5 rabbits respectively what was 15.2 %, 20.1 % and 6.7% of the parental mean. The A2066 females were significantly different for fertility (+ 0.08 mating/needed/kindling) and also for percentage of stillbirths (+ 6 %). This study evidenced that there is a positive heterosis effect in crossbred females in farms as it was demonstrated in laboratory conditions.

29 - FAYOS L., CLIMENT A., SANTACREU M.A., GALLEGO M., MOLINA I., BLASCO A.

Fertilisation rate and embryo development in two rabbit lines divergently selected on uterine efficiency.

6èmes Journées de la Recherche Cunicole en France, INRA-ITAVI, La Rochelle 6-7 déc. 1994, 211-215.

Departamento de Ciencia Animal. Universidad Politécnica de Valencia, P.O. Box 22012, 46071 Valencia (Spain)

40 females from three groups of rabbit does were used in the experiment. The groups were two lines selected to increase (EU+ = 15) and decrease (EU- = 9) litter size on unilaterally ovariectomized does. A group of intact does (I = 16) served as control. All the does were slaughtered 30 hours after mating. The number of oocytes (OR) and embryos (ER) and the number of blastomere of the embryos were recorded. Ovulation rate (TO) was estimated by counting the corpora lutea. The total amount of oocytes and embryos recovered (RT=OR+ER), the recovering ratio (TR= RT/TO x 100) and the fertility ratio (TF= ER/TR x 100) were calculated. The average number of cells of the embryos of the same litter (M) and their standard deviation (S) were also calculated. Least square means for the three groups were calculated on a model with group, parity and level of haemorrhagic follicles effects. It seems that the lines EU have a lower recovering ratio than the control TR (EU+, EU-, I)=(0.91, 0.84, 1). The recovering is affected by the presence of haemorrhagic follicles. The fécondation rate is very high TF(EU+, EU-, I)=(0.995, 0.998, 1). It seems that all the groups have the same number of blastomere M(EU+, EU-, I)=(3.75, 3.97, 4.05) and that the EU+ does have a more uniform embryo development S(EU+, EU-, I)=(0.42, 0.68, 0.62).

30 - GOMEZ E.A, BASELGA M., CIFRE J.

The influence of maternal effects in selection for litter size in rabbits

6èmes Journées de la Recherche Cunicole en France, INRA-ITAVI, La Rochelle 6-7 déc. 1994, 217-224.

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The selection for litter size at weaning was simulated for ten generations. Maternal effects has been considered in the simulation model. Twelve cases of genetic parameters were considered. The

breeding values were estimated with an animal model of repeatability and records of the current generation and the previous one. The variance of direct genetic effects was always 10% of the phenotypic variance, and the repeatability was 20%. In the simulation, the variance of maternal genetic effects ranged between 0 and 50% of the direct genetic variance. The genetic correlations ranged between +0.3 and -0.7. When the simulation model did not include maternal effects, the response was +0.22 young rabbits per litter and generation. Higher responses, +0.25-0.32 young rabbits, were obtained when maternal effects were positively correlated with direct effects. The minimum response was achieved with high negative correlations and large genetic maternal variance (0.12 young rabbits per litter and generation). The influence of maternal effects negatively and weakly correlated with direct effects was dependent on the value of the genetic maternal variance. The accuracy of the selection is reduced by negative genetic correlations. The reduction increased with high maternal variances. Reductions in the initial genetic variances (direct and maternal), around 15%, were observed in all cases.

31 - JOLY T.*, RENARD J.P.

Establishment of a cryobank of gametes and embryos: a new tool for selection and preservation of rabbit population.

6èmes Journées de la Recherche Cunicole en France, INRA-ITAVI, La Rochelle 6-7 déc. 1994, 225-233.

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The establishment of a cryobank of gametes and embryos would currently be very useful in maintaining animal genetic diversity and in protecting populations threatened with extinction. We have begun to establish such a bank using the rabbit as a model, a species which is of interest from both zootechnological and biomedical point of view. We first defined the genetical and technical parameters for establishing an embryo bank. Subsequently we have begun to apply these techniques of cryopreservation to several populations: a line with a monogenical mutation (rabbit "sauteur d'Alfort"), a line of biomedical interest selected for allotypic variation in genes coding for immunoglobulin heavy chain, a synthetic line (INRA 1029) support of a divergent selection experiment, a breed with reduced population size (the "Brun-marron de Lorraine"). With these lines we evaluated the global costs to save a population. Now, this research should allow us to define the scientific and economic choices important in the extension of this work to other rabbit populations.

32 - ROCHAMBEAU H. de, RETAILLEAU B.*, ELSEN J.M.

Genetic analysis of mandibular prognathism in the rabbit

6èmes Journées de la Recherche Cunicole en France, INRA-ITAVI, La Rochelle 6-7 déc. 1994, 235-240.

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The genetic control of prognathism was studied in a selected rabbit strain. From 35299 animals observed before 13 weeks of age between 1990 and 1993, 0,59 % showed the default. A segregation analysis lead to the conclusion that the trait is under the control of a recessive major gene with a low penetrance.

33 - ROCHAMBEAU H. de, RETAILLEAU B. *, POIVEY J.P., ALLAIN D.

Selection for individual weight at 70 days in rabbits

6èmes Journées de la Recherche Cunicole en France, INRA-ITAVI, La Rochelle 6-7 déc. 1994, 241-245.

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(2) Grimaud Frères, La Corbière, 49450 Roussay (France)

In this paper, we analyse the individual weight at 70 days from 66004 rabbits born between January 1st, 1987 and the December 31st, 1992. Additive genetic and maternal variances for this trait, expressed as a proportion of phenotypic variance are equal to 0,16 and 0,17. Selection intensity (0,98) and generation length (48 weeks) are a bit smaller than unity. Annual genetic progress, estimated by a BLUP animal model is around 37 g.

34 - SANTACREU M.A. , CLIMENT A., ARGENTE M.J., BLASCO A.

Relationships between characteristics and irrigation level of the fetus and fetal survival in two lines of rabbit divergently selected for uterine efficiency

6èmes Journées de la Recherche Cunicole en France, INRA-ITAVI, La Rochelle 6-7 déc. 1994, 247-253.

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A total of 115 rabbit does from two lines selected to increase (EU+) or decrease (EU-) litter size on unilaterally ovariectomized does and a group of 41 intact does were used in the experiment. All the does were slaughtered at the 25th day of the 5th gestation. The number of live and dead fetuses, the weight of the fetus and the weight of fetal and maternal placentae were recorded. The irrigation of each implantation site was classified according to the number of veins. The intact does showed a slightly lower fetus weight. EU+ does showed the highest values of fetal and maternal placentae weight of the live fetuses. The fetuses placed at the top and bottom of the uterine horn were heavier, being the heaviest the fetuses placed near the ovary. However, fetal survival was better for the fetuses near the bottom of the uterus, and worse for the fetuses placed near the ovary. Fetuses at the bottom of the uterus had a better irrigation. Live fetuses had also a better irrigation than dead fetuses, and fetuses with a poor irrigation were slightly lighter.

FOURRURE ET LAINE ANGORA

35 - BOUCHER S., DENIS B.*

Genetic study of the thuringier coat in the rabbit : an original recessive gene.

6èmes Journées de la Recherche Cunicole en France, INRA-ITAVI, La Rochelle 6-7 déc. 1994, 255-262.

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There is traditionally two genetic interpretations for the thuringier coat (black and fawn), in the rabbit. In the first interpretation, the