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FATTENING QUALITIES OF PIGS OF VARIOUS BREEDING DIRECTIONS IN PUREBRED BREEDING, CROSSING AND HYBRIDIZATION IN THE CONDITIONS OF MODERN PORK PRODUCTION

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In order to determine the influence of breed and breeding methods on the productive characteristics of pigs in the process of rearing and fattening, seven experimental groups were formed with animals of different genotypes and breeding directions. Three methods of pig breeding were used in the experiment: Pure breeding (intra-linear), crossbreeding between breeds and breed-linear hybridisation. It was found that the highest live weight gains were achieved by hybridisation with the terminal parental line PIC-337, while purebred breeding with specialised parental lines showed limited efficiency under industrial conditions. A comparison between large white pigs and landraces shows that the landrace has a slightly better growth potential, but the increase in live weight remains moderate. It has been proven that piglets of the PIC-337 endline, which were selected for increased growth energy, are clearly superior to the analogues of the dam breeds in all important growth indicators such as average daily growth during the suckling period and during rearing, as well as total weight at the end of rearing; they consumed more feed during rearing, and converted it more efficiently into live weight gain. At the same time, the hybrids are superior to the indigenous animals in breed-linear hybridisation for all indicators of growth intensity, especially during the rearing phase. The advantage of the hybrids over the local forms in the range of 2–13% is due to the influence of the inheritance of the terminal boar of the PIC-337 line. It was found that animals with the genotype $(\frac{1}{4}L \times \frac{1}{4}LW)_{\frac{1}{2}}PIC-337$ were more productive than similar hybrids with $(\frac{1}{4}LW \times \frac{1}{4}L)_{\frac{1}{2}}PIC-337$, suggesting that the use of landrace sows as the dam line is appropriate in the creation of hybrids with maximum realisation of the heterotic effect. Thus, the use of crossbreeding and three-line hybridisation can significantly improve piglet productivity both during the suckling period and during rearing. The hybrid animals showed the best results, confirming the effectiveness of heterosis, and the use of landrace sows as the dam line provides an additional improvement in the growth indicators of the offspring. It was found that an intermediate type of inheritance characterised hybrids $(\frac{1}{4}LW \times \frac{1}{4}L)_{\frac{1}{2}}PIC-337$ with 9–13% lower productivity than purebred animals PIC-337, but with better conservation. Instead, the hybrids $(\frac{1}{4}L \times \frac{1}{4}LW)_{\frac{1}{2}}PIC-337$ showed marked heterosis, especially in terms of growth rate, absolute growth, and conservation. It was found that the animals of the PIC-337 parental line had significant advantages in fattening in terms of growth rate, reduction in fattening time and increased feed conversion efficiency compared to the parental breeds, making them promising for commercial pork production with high animal turnover rates. Hybrids involving the PIC-337 parent line are characterised by high preservation and close to the indicators of the pure line for feed conversion, but had slightly lower growth rates and feed efficiency. These results indicate an intermediate form of inheritance of these traits, and, considering the significantly higher number of piglets in the nests of hybrid pigs, the further use of hybrids in intensive pig breeding systems is feasible, taking into account their genetic characteristics.



Keywords: pigs, breed, crossbreed, hybrid, preservation, growth rate, feed conversion

ВІДГОДІВЕЛЬНІ ЯКОСТІ СВИНЕЙ РІЗНОГО СЕЛЕКЦІЙНОГО СПРЯМУВАННЯ ЗА ЧИСТОПОРОДНОГО РОЗВЕДЕННЯ, СХРЕЩУВАННЯ І ГІБРИДИЗАЦІЇ В УМОВАХ СУЧАСНОГО ВИРОБНИЦТВА СВИНИНИ

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Для визначення впливу породи та методів розведення на продуктивні характеристики свиней у процесі дорощування та відгодівлі було сформовано сім експериментальних груп тварин різного генотипу та напрямку селекції. В експерименті застосовували три методи розведення свиней: чистопородне (внутрішньолінійне), міжпородне схрещування та породно-лінійна гібридизація. Встановлено, що найвищі прирости живої маси забезпечуються при застосуванні гібридизації з використанням термінальної батьківської лінії РІС-337, тоді як чистопородне розведення у спеціалізованих материнських лініях демонструє обмежену ефективність у промислових умовах. Порівняння свиней великої білої та ландрас порід засвідчує, що порода ландрас має децю кращий потенціал росту, але приріст живої маси залишається помірним. Доведено, що поросята термінальної лінії РІС-337, які селекціонуються в напрямку підвищення енергії росту суттєво переважають аналогів материнських порід за всіма основними показниками росту такими як, середньодобові прирости у підсисний період та під час дорощування, а також загальною масою по завершенню дорощування, вони під час дорощування споживали більше корму, й ефективніше його конвертували у приріст живої маси. Водночас гібридні тварини за породно-лінійної гібридизації значно переважають помісних за всіма показниками інтенсивності росту, особливо в період дорощування. Виявлена перевага гібридів над помісними формами в межах 2–13% зумовлена впливом спадковості термінального кнура лінії РІС-337. Встановлено, що тварини з генотипом $(\frac{1}{4}Л \times \frac{1}{4}ВБ) \frac{1}{2}РІС-337$ виявились продуктивнішими за аналогічних гібридів з $(\frac{1}{4}ВБ \times \frac{1}{4}Л) \frac{1}{2}РІС-337$, що вказує на доцільність використання свиноматок породи ландрас як материнської лінії при створенні гібридів із максимальною реалізацією гетерозисного ефекту. Таким чином застосування міжпородного схрещування та трилінійної гібридизації дозволяє суттєво покращити продуктивність порослят як у підсисний період, так і під час дорощування. Гібридні тварини показали найвищі результати, що підтверджує ефективність гетерозису, а використання свиноматок породи ландрас в якості материнської лінії забезпечує додаткове покращення ростових показників потомства. Встановлено, що гібриди $(\frac{1}{4}ВБ \times \frac{1}{4}Л) \frac{1}{2}РІС-337$ характеризувалися проміжним типом успадкування з продуктивністю, що була на 9–13% нижчою за чистолінійних тварин РІС-337, але з кращою збереженістю. Натомість гібриди $(\frac{1}{4}Л \times \frac{1}{4}ВБ) \frac{1}{2}РІС-337$ виявили яскраво виражений гетерозис, особливо у темпах росту, абсолютному прирості та збереженості. Встановлено що під час відгодівлі тварини батьківської лінії РІС-337 мали виражені переваги у швидкості



росту, скороченні періоду відгодівлі та підвищеній ефективності використання корму, порівняно з материнськими породами, що робить їх перспективними для комерційного виробництва свинини з високими темпами обороту поголів'я. Гібриди з участю батьківської термінальної лінії PIC-337 характеризуються високою збереженістю і близькими до чистолінійних показниками кормоспоживання, але мали децю нижчі темпи росту та ефективність корму. Ці результати вказують на проміжну форму успадкування цих ознак та з врахуванням суттєво вищої кількості поросят в гніздах гібридних свиней на доцільність подальшого використання гібридів у системах інтенсивного свинарства з врахуванням їх генетичних особливостей.

Ключові слова: свині, порода, помісь, гібрид, збереженість, інтенсивність росту, конверсія корму.

Introduction. The use of the latest genetic technologies and breeding methods can significantly improve the growth indicators of animals and the efficiency of feed payment in increments, which contributes to improving production efficiency and product quality. In particular, as noted (Li Q. et al., 2022), thanks to genomic selection, it is possible to identify genes and alleles associated with the synthesis of growth hormones, which can accelerate this process and significantly affect its intensity in pigs. In addition, according to (Kim S. W. et al., 2022; Wientjes Y. C. J. & Calus, M. P. L., 2017), the genotype of animals and their breeding methods determine the effectiveness of feed assimilation, which indicates the presence of a genetic predisposition to more rational use of them. According to the study (De Vos, C. J. et al., 2020; Wu X. L. & Zhao S., 2021), different genotypes of pigs show different efficiency in feed assimilation, which is explained by the variability of their metabolic processes. These differences determine the ability of some animals to convert nutrients into muscle tissue more efficiently, while others are less productive in this aspect. A similar opinion is expressed by (Li H. et al., 2020), noting that genetic factors associated with the regulation of appetite and metabolism significantly affect the level of feed assimilation. Mutations in the genes responsible for the metabolism of essential nutrients – proteins, fats and carbohydrates – can significantly change the efficiency of feed use, which is directly related to the productivity of animals and the economic performance of pig farms. In this regard, as noted (Do D. N. et al., 2013; Amer P. R. et al., 2014; Li Q. et al. 2020; Jin L. et al., 2023), modern genetic breeding programs actively integrate genome information to improve fattening characteristics, which contributes to increasing the profitability of pork production.

In their studies (Dube B, et al., 2013), and (Šprysl M., et al., 2005; Zhou P, et al. 2023; Li H., et al., 2022) consider an approach to genetic selection that includes economic factors to identify and use genes that are key to increasing fattening productivity, which ultimately contributes to more efficient and more competitive pork production. In turn (Schroyen M. & Tuggle C. K., 2015; Kasper, C. et al., 2020; Roth K, et al., 2022; Yang C., et al., 2023; Xie Z. et al., 2023), note that the genotype of an animal affects the functioning of the immune system, which determines the ability of pigs to resist diseases. Increased resistance to diseases not only reduces the cost of Veterinary Measures but also contributes to better assimilation of feed, which has a positive effect on the overall productive characteristics of animals. Therefore, selecting genes associated with immune resistance can significantly improve fattening outcomes.

Also important factors in improving the productive qualities of pigs are their breeding methods. As noted (Christiansen G. M. et al., 2014), the widespread use of crossbreeding in pig breeding is due to the advantages of hybrid strength (Heterosis) and



a high level of breed compatibility. However, according to the data (Sørensen M. K. et al., 2008; Vashchenko O. V., 2017; Bates R. O., 2020; Wu X. L. & Zhao S., 2021; Kremez M. et al., 2025) the resulting increase in productivity due to heterosis, as a rule, is not preserved in subsequent generations, which makes it necessary to preserve purebred lines for reproduction and further improvement. At the same time, the different orientation of inheritance of reproductive and fattening traits limits the full use of the hybrid power effect. In this regard, a more effective strategy is increasingly used in modern pig breeding – intra-breed or breed-linear hybridization (Povod M. et al., 2021; Lykhach V. et al., 2023; Baranovskyi A. M. & Tkachuk O. M., 2024; Tatsii O., 2021). Within the framework of this approach, maternal lines are selected separately, which are usually represented by Yorkshire and landrace breeds, as well as paternal (terminal) lines that include Duroc, Pietren breeds or combinations thereof. These genotypes are used to improve the meat and fattening qualities of offspring. It is important that all lines are kept separately and regularly checked for combinative ability (Clutter A. C. et al., 2004; Vashchenko O. V., 2016; Iversen M. W. et al., 2019; Bates R. O., 2020), which provides a steady increase in productivity in commercial livestock. So, according to information (Smith W. C. et al., 1990), hybrids in which Duroc or Hampshire breeds are used as final producers showed better fattening and meat qualities compared to the Great White × landrace combination, which makes them more effective for use in conditions of intensive meat production. According to the study (Shuplik V. & Shcherbatiuk N., 2024), descendants of specialized parent breeds such as Duroc and Pietrain showed higher growth rates than Animals of the Great White and landrace breeds. Also, as reported (Baranovsky A. M. & Tkachuk O. M., 2024), when comparing different methods of breeding breeds of pigs, Bolshaya Belaya, landrace, Pietrain during purebred breeding and crossing, it was found that in terms of growth indicators, local animals showed the best dynamics throughout the entire growing period. At the end of fattening, crossbred animals $\frac{1}{2}$ large white × $\frac{1}{2}$ landrace reached a weight of 100 kg in 10 days, and animals from the combination $\frac{1}{4}$ large white × $\frac{1}{4}$ landrace × $\frac{1}{2}$ Pietrain were 8 days faster than their purebred counterparts of the large white breed. At the same time, according to the study (Maribo H. B. et al., 2018), Danish pigs obtained by three-breed hybridization under the Duroc × landrace × Yorkshire (DLY) scheme showed an average daily weight gain of 15.5% higher than in animals of the Pietrain × landrace × Yorkshire (PLY) combination, and also had 6.9% better feed efficiency, indicating the advantage of the DLY genotype for use in intensive meat production. And as a result, in Danish breeding systems, the Duroc is the main parent breed. A similar situation is observed in the pork market in China, where according to reports (Bergamaschi M. et al., 2020) Duroc has become the preferred option for specialized parent pig breeding, mainly as claimed (Strathe A. B. et al., 2010) due to the high growth rate, good feed pay, high slaughter yield and the percentage of lean meat in the carcass. As a result, as reported (Liu X. et al., 2019), more than 70% of commercial pork production in China comes from dly animals, which are obtained by hybridizing Duroc Boars with local sows (landrace × Yorkshire). Where those other results cited in their research (Nielsen B. & Velandar I., 2018), when comparing the fattening performance of purebred Duroc pigs and their D(LY) – Duroc × (landrace × Yorkshire) hybrids. Their experiments showed no significant difference in the average daily weight gain of purebred and hybrid animals. In contrast, purebred duroks showed 5.9% (0.09 kg) better feed efficiency than hybrid animals D(LY). At The Same Time (Bergamaschi M. et al., 2020) reports that for purebred breeding of pigs of the Duroc, landrace and Yorkshire breeds in terms of economic efficiency of feeding pigs of the Duroc breed, the lowest indicators were found both in terms of growth and feed efficiency, among the compared breeds, so the feed conversion rate was the best in



animals of the landrace breed, it was 10–15% better than in analogues of the Great White, and 8–12% better than in representatives of the Duroc breed. The highest growth rate was shown by pigs of the large white breed, 4.4% higher than in animals of the landrace breed, and 5.9% higher than in their counterparts of the Duroc breed. In contrast to their findings in the messages (Kasper C. et al., 2020; Liu S. et al., 2023) the advantage of hybrid pigs using Duroc animals in the final production phase is noted. Also based on the results of the study (Maribo H. et al., 2018), during the fattening period, crossbreeds of Danish breeding pigs (landrace × Yorkshire sows in combination with Danish Duroc Boars) showed higher average daily increments: by 143–165 G when fed ad libitum and by 88 g – with a limited regime, as well as better by 0.04–0.07 kg feed efficiency compared to similar combinations, where German pietren Boars were used as the final form. According to the data (Chernenko O. M. et al., 2022), in the conditions of Ukraine, young animals obtained as a result of hybridization using pigs of Danish origin ($\frac{1}{4}Y \times \frac{1}{4}L \times \frac{1}{2}D$) showed better fattening indicators compared to local animals according to the $\frac{1}{2}Y \times \frac{1}{2}L$ scheme. In particular, the increase in live weight was higher by 5.4%, the efficiency of feed use by 5.2%, and the weight of 100 kg of these pigs reached 2.9% faster.

Thus, Duroc Boars are a world leader in use as the final form in the hybridization system. However, as noted (Do D. N. et al., 2013) in recent years, some weaknesses of boars of this breed have been identified, which include low heritability of feed efficiency, reduced multiple pregnancies, and a tendency to lose weight under abnormal conditions. Therefore, due to the growing demands of the market, more and more commercial breeding companies are seeking to develop new parent lines based on a combination of other pig breeds. Unlike the duroks, as believed (Li Q. et al., 2020), Yorkshire pigs are not only more intense in growth and have a higher content of lean meat, but also have an attractive exterior, good meat qualities, and increased stress resistance. Considering the differentiation of demand, breeding companies carry out targeted work to create new parent lines of the Yorkshire breed. Thus, the Dutch firm Topigs Norsvin (TN) uses large white pigs as the final breeding male to form the TN Tempo line, which is characterized by high viability of the offspring, strong musculature of the limbs, fattening efficiency, and good feed conversion rates (Nielsen T. & Larsen S., 2018; Topigs Norsvin, 2022).

The world leader in the production of breeding pig products (Pig Improvement Company, PIC) has developed synthetic terminal lines of boars based on a combination of several breeds (Genetic Update Programs, 2025). Among the PIC terminal boards, the main ones are the PIC–337, PIC–800, and PIC–359 lines, each of which has its own advantages and purpose. The PIC–337 boar is a versatile terminal boar bred on the basis of a combination of breeds with high growth rates and excellent feed conversion. It is characterized by a stable high daily growth rate, high–quality carcass, and uniformity of offspring, which ensures economic efficiency in commercial production (Pig Progress, 2023). The PIC–800 line, based on the Duroc breed, is characterized by increased viability of piglets, improved average daily growth and high quality of meat – the meat is juicy and tender. Thanks to these characteristics, the PIC–800 is suitable for producing piglets with increased taste and stress resistance (PIC Genetics, 2023; Topigs Norsvin, 2022).

The PIC–359 boar is based on the pietren breed and is designed to produce lean meat with a high content of muscle tissue. This boar shows good muscle depth, efficient feed conversion, and high meat productivity, making it the optimal choice for markets focused on lean pork (PIC Genetics, 2023).

As noted (Kremez M. et al., 2024), the use of boars of the synthetic parent line PIC–337 as a terminal form in the cultivation of piglets contributed to an increase in rearing efficiency. In particular, the average daily growth increased by 15.1%, nest weight



at the end of the period by 19.4%, and feed conversion improved by 1.7%, compared to offspring from Boars of the Great White and landrace breeds.

The opposite results were obtained in their studies (Bergamaschi M. et al., 2020), who reported that purebred pigs of the large white breed had a higher average daily increase of 4.4% compared to animals of the landrace breed, while the feed conversion rate was better by 10–15% in animals of the landrace breed. The results are consistent with the data (Baranovsky D. & Tkachuk O., 2024), which indicate that Landrace pigs were inferior to their peers of the large white breed in terms of growth rate: in 2 months, by 3.4%, in 4 months, by 1.8%, in 6 months, by 2.4%, and in 8 months – by 1.5%. But local pigs ($\frac{1}{2}$ large white \times $\frac{1}{2}$ landrace) exceeded both large white breeds (by 1.1% at 2 months, 2.5% at 4, 1.7% at 8 months) and landraces (by 4.7%, 4.5%, 2.4% and 3.2%, respectively, at 2, 4, 6, and 8 months). This indicates the effectiveness of interbreeding in increasing the growth rate of young animals. Whereas (Santiago G. et al., 2022) did not establish significant differences in the productivity of large white and Landrace pigs during fattening. Thus, the average daily feed consumption for fattening pigs of the landrace breed was 2.14 kg, which is 1.4% more than in the large white breed. In terms of feed conversion, landrace animals had an indicator of 2.37 kg, which is 1.7% worse than their counterparts in the Great White breed. At the same time, in terms of growth rate, landrace animals were ahead of representatives of the Great White breed by 0.7%, with an average daily growth of 906 G against 900 g for the Great White. Whereas in research (Kremez M. et al., 2024), opposite results were established. Thus, during rearing, purebred piglets of the large white breed were inferior to landrace animals in terms of average daily growth by 4.1%, and by 4.0% in terms of live weight of piglets at the end of the period. At the same time, local animals obtained as a result of direct and reverse crossing of these breeds did not have significant differences in growth intensity indicators. However, these crossbreeds were characterized by a higher feed consumption of 0.7–4.8% and at the same time showed a more efficient feed payment by increments of 2.2–5.3% compared to the original parent breeds. Whereas, analysis of fattening productivity of Mother breeds in the northern states of the United States and Canada during purebred breeding and crossing over the past five years (Collins C. L. et al., 2017) showed that at the beginning of the study, Landrace pigs had slower growth, were significantly fatter than large white animals, and were inferior to them and their crossbreeds in terms of feed conversion rate. At the same time, over five years, landraces showed a significant improvement in productive indicators, and at the end of the study, their genetic value reached the level of other breeds.

Geoclimatic conditions significantly influence the manifestation of fattening signs. However (Zhou P, et al., 2023) studying the age of reaching 100 kg of live weight and fat thickness at 100 kg in three populations of large white pigs from Canada (n=500), Denmark (n=295) and the United States (n=1500) revealed the relative stability of these indicators regardless of regional breeding of the breed.

As reported (Yurchenko O. S. et al., 2024) most industrial farms in Ukraine use foreign genotypes of pigs, testing the combinational ability of which in rather harsh conditions of Ukraine, as believed (Lykhach V. Ya. et al., 2023) should be carried out with a certain frequency, which is what our work is devoted to.

The aim of the study was to determine the influence of breed and breeding methods on the productive characteristics of pigs in the process of rearing and fattening.

Research material and methodology. To achieve the research goal, seven experimental groups of animals of different genotypes and breeding directions were formed on the basis of LLC "NPP "Globinsky Pig Complex" (Table 1).



Table 1.

Scheme for studying the influence of the breed and breeding method on the fattening qualities of pigs

Indicator	pig group and its purpose						
	I Control	II experimental	III experimental	IV experimental	V experimental	VI experimental	VII experimental
Number of animals, head	200	200	100	200	200	200	200
Breeding method	purebred (intralinear)			crossing		hybridization	
Breed of the mother	LW	L	L-65	LW	L	♀ LW × ♂ L	♀ L × ♂ LW
Genotype of boars	LW	L	PIC-337	L	BБ	PIC-337	PIC-337
Genotype of offspring	LW	L	PIC-337	1/2 LW 1/2 L	1/2 L 1/2 LW	(1/4 LW 1/4 L) 1/2 PIC-337	(1/4 L 1/4 LW 1/2 PIC-337)

According to the study scheme, seven groups of experimental piglets were formed during the weaning of piglets in the study of the reproductive qualities of sows. First (control) and groups II–VII (experimental). In the experiment, three approaches to reproduction were used: purebred (intralinear) breeding (groups I, II, and III), interbreeding, and breed-linear hybridization (groups VI and VII).

Genotypic structure of the maternal forms: Large White (LW), landrace (L), as well as combinations of – LW×L and – L×LW, and sows of the parent terminal Line L–65. Boars are represented by breeds LW, L, and hybrid line PIC–337. Accordingly, the offspring's genotype varied from purebred to complex hybrids of Type (1/4LW×1/4L) × 1/2PIC–337 and (1/4L1/4LW1/2)×PIC–337.

The conditions for keeping animals in all groups were unified: the suckling period was 28 days, rearing was 49 days, and fattening was 100 days. The preservation of animals, growth intensity, and feed efficiency indicators were monitored during the experiment, considering the genotype and breeding methods.

To assess the productivity of pigs, the fattening quality index was used according to the formula adapted by M. I. Berezovsky in the presentation (Ladyka V. I. et al., 2023):

$$I = A^2 / (B C) ,$$

where: a – gross gain for the fattening period, kg; B – number of days of fattening; C – feed consumption per 1 kg of weight gain.

Feeding, keeping, caring for animals, and preventive measures were carried out per the current European legislation on the welfare of farm animals (European Union, 2010).

The obtained experimental data were subjected to statistical processing by methods of variation statistics per the recommendations (Ladyka V. I. et al., 2023) using a personal computer and MS Excel 2016 software tools.

Research results. When comparing the growth intensity and safety of Pigs during rearing between groups of animals of different breeding orientation (maternal breeds –



large white (group 1) and landrace (Group 2), and the parent line PIC–337 (Group 3), which was selected for increased growth rate, it was found that piglets of the terminal line PIC–337 had a birth weight of 1.43 kg, which is highly likely ($p<0.001$) by 13.5% more compared to analogues of large white and by 10.9% compared to with landrace animals (Table. 2).

Table 2.

Growth rate of purebred and purebred piglets during the suckling period and during rearing

Indicator	experimental groups		
	1	2	3
Number of piglets put up for rearing, head	150	150	150
Birth weight of piglets, kg	1,26±0,005	1,29±0,010	1,43±0,006 ^{bb ggg lll mmm nnn ooo}
Weight of piglets at weaning at 28 days, kg	6,72±0,029	6,75±0,05	8,04±0,03 ^{bbb ggg}
Average daily growth from birth to 28 days, g	195±0,77	195±1,52	236±0,93 ^{bbb ggg lll mmm nnn ooo}
Weight of piglets at the end of rearing, kg	26,60±0,11	26,81±0,20	32,60±0,13 ^{bbb ggg lll mmm nnn ooo}
Absolute growth rate, kg	19,88±0,08	20,06±0,15	24,56±0,10 ^{bbb ggg lll mmm nnn ooo}
Average daily gain from 28 days to 77 days	406±1,61	409±3,41	501±1,82 ^{bbb ggg lll mmm nnn}
Number of piglets transferred to fattening, head	146	147	145
Safety of piglets on rearing	97,3	98,0	96,7

Note. Here and further the probability of differences between groups: ^a–1 and 2; ^b–1 and 3; ^c–1 and 4; ^d–1 and 5; ^e–1 and 6; ^f–1 and 7; ^g–2 and 3; ^h–2 and 4 ⁱ–2 and 5; ^j–2 and 6; ^k–2 and 7; ^l–3 and 4; ^m–3 and 5; ⁿ–3 and 6; ^o–3 and 7; ^p–4 and 5; ^q–4 and 6; ^r–4 and 7; ^t–5 and 6; ^u–5 and 7; ^v–6 and 7

When weaned at the age of 28 days, the weight of linear piglets PIC–337 was 8.04 kg, which is 19.6% higher compared to Animals of the LW and 19.1% higher compared to analogues of the landrace breed ($p<0.001$).

The average daily growth during the suckling period in piglets of the terminal line reached 236 g, 21.0% more ($p<0.01$) than piglets of both mother breeds. At the end of rearing, the weight of piglets of the PIC–337 terminal line reached 32.60 kg, while in the LW it was 22.6%, and in animals of the landrace breed it was 21.6% less, compared to the peers of the terminal line ($p<0.001$).

The average daily growth during rearing in piglets of the terminal line was 501, which is highly likely ($p<0.001$) to be 23.4% higher compared to the peers of the large white breed and 22.5% higher than in animals of the landrace breed, which contributed to an increase in their absolute weight gain, which in piglets of the synthetic line PIC–337 was 24.56 kg, which is 23.5% more compared to the large white and 22.4% more than landraces ($p<0.001$).



During rearing, piglets of all groups that were analyzed showed high rates of piglet safety: 97.3% in the Large White, 98.0% in the landras, while among animals of the synthetic line PIC–337, it was 0.6–1.3% lower and amounted to 96.7%.

Comparing the parent breeds, great white and landrace, we found similar results in the leading indicators. There was a tendency for landrace piglets to predominate in terms of average daily increments of 3 g, which caused them to have 0.18 kg more absolute increments. Also, piglets of this group had a slightly higher preservation rate of 0.7%. However, these differences are insignificant, indicating a comparable genetic potential of both breeds selected in the maternal direction.

In the table. 3. The results of comparison of growth characteristics in the suckling period and during rearing of piglets obtained as a result of direct and reverse crossing of animals of maternal breeds and hybrid young pigs obtained by combining cross sows from such crossing and Boars of the synthetic parent line are presented.

Table 3.

Growth rate of cross–breed and hybrid pigs during the suckling period and during rearing

Indicator	experimental groups			
	4	5	6	7
Number of piglets put on rearing, head	150	150	150	150
Weight of piglets at birth, kg	1,34±0,010 <i>cc hhh</i>	1,36±0,006 <i>iii</i>	1,35±0,005 <i>iii</i>	1,39±0,005 <i>f</i> <i>kkk rrr vvv</i>
Weight of piglets in 28 days, kg	6,98±0,05 <i>ccc hhh</i>	7,04±0,02 <i>ddd iii</i>	7,12±0,02 <i>eee jjj qq</i>	7,24±0,025 <i>fff</i> <i>kkk rrr uuu vv</i>
Average daily growth from birth to 28 days, g	201±1,77 <i>ccc hh</i>	203±0,75 <i>dd iii</i>	206±0,73 <i>eee jjj qq tt</i>	209±0,69 <i>fff kkk</i> <i>rrr uuu vvv</i>
Weight of piglets at the end of rearing, kg	27,53±0,22 <i>ccc h</i>	27,83±0,11 <i>ddd</i> <i>iii</i>	29,35±0,10 <i>eee jjj qq ttt</i>	31,54±0,10 <i>fff kkk rrr uuu vvv</i>
Absolute growth rate, kg	20,55±0,16 <i>ccc h</i>	20,79±0,08 <i>ddd iii</i>	22,23±0,07 <i>eee jjj qq ttt</i>	24,30±0,08 <i>fff kkk rrr uuu vvv</i>
Average daily gain from 28 days to 77 days, g	419±3,15 <i>ccc</i>	424±1,53 <i>ddd</i>	454±1,41 <i>eee qq ttt</i>	496±1,66 <i>fff kkk</i> <i>rrr uuu vvv</i>
Number of piglets transferred to fattening, head	147	148	148	148
Safety of piglets on rearing, %	98,0	98,7	98,7	98,7

The weight of piglets at birth in local groups averaged 1.35 kg, while in hybrid groups, 1.37 kg, which is 0.02 kg or 1.5% more. The average daily weight gain during the suckling period in hybrid piglets was 2.7% higher ($p<0.01$) – 207.5 g compared to 202 g in cross animals, which contributed to their advantage in absolute weight gain by 2.1–2.4% and, together with a larger weight at birth, caused an excess of live weight at weaning by 0.17 kg or 2.4% ($p<0.01$).

During rearing, a higher growth rate was also found in hybrids compared to local piglets. Thus, according to the average daily weight gain during this period, hybrid animals prevailed by 53.5 g or 12.7% ($p<0.001$) of cross-country analogues – 475 g against 421.5 g. this caused a significant difference in the absolute weight gain, which in



hybrids was 23.27 kg, which exceeded the indicators of crossbreeds by 2.6 kg or 12.6% ($p < 0.001$) and together with the larger mass of animals at the beginning of rearing led to an excess of hybrids over crossbreeds at the end of rearing by 10.0% or 2.77 kg ($p < 0.001$).

The safety of hybrid piglets in rearing was consistently high – 98.7%, while in crossbreeds it ranged from 98.0–98.7%, which did not significantly affect the overall results.

When comparing hybrid groups 6 and 7, taking into account their genotype, the advantages of animals of Group 7 were established, where the maternal basis was local sows ($\text{♀L} \times \text{LW}$) over animals of Group 6, where the maternal basis was crossbreeds ($\text{♀LW} \times \text{L}$), by birth weight by 0.04 kg or 3.0% ($p < 0.001$), by weight at weaning – by 0.12 kg or 1.7%, ($p < 0.01$), on average daily gains during rearing by 42 g or 9.3% ($p < 0.001$), which led to their advantage in absolute gains by 2.07 kg and contributed to an increase in body weight in 77 days to 31.54 kg, which is 2.19 kg or 7.5% more than in animals of Group 6 ($p < 0.001$).

When comparing the growth characteristics of piglets of purebred, local, and hybrid origin during the suckling period and at the rearing stage, a clear relationship was established between the genotype of animals and the intensity of their growth (Tables 2 and 3). Thus, the weight of piglets at birth in purebred animals of maternal breeds averaged 1.28 kg, while in crossbred piglets this indicator was 5.9% higher at the level of 1.35 kg. At the same time, hybrid animals had an even higher birth weight – an average of 1.37 kg, which is 7.5% higher than purebred animals and 1.5% higher than crossbreeds. The average daily weight gain during the suckling period was lowest in purebred pigs – 195 g, while crossbreeds had an average daily weight gain of 202 g (+3.6%), and hybrids – 207.5 g (+6.4% for purebred pigs and +2.7% for crossbreeds). Due to this, taking into account the different large-fruited animals of these groups, the live weight of piglets at weaning in purebred pigs was 6.74 kg, in crossbreeds it was higher by 4.1%, and in hybrids by 6.6% compared to purebred pigs and by 2.4% in hybrids compared to crossbreeds.

At the end of the rearing period, the live weight of purebred piglets averaged 26.71 kg, while in crossbreeds it was 3.7%, and hybrid animals – 14.0% more ($p < 0.001$) compared to purebred animals. At the same time, hybrid animals prevailed in this indicator by 10.0% of local analogues ($p < 0.01 - 0.001$). This is caused by higher absolute increases in live weight during rearing, which amounted to 19.97 kg in purebred animals, 3.5% in crossbreeds, and 16.5% in hybrids compared to purebred animals and 12.6% compared to crossbreeds, respectively, larger. This, in turn, was determined by higher average daily increments in the period from 28 to 77 days, which amounted to 407.5 g in purebred piglets, 3.4% in crossbreeds, and 16.6% more in hybrid piglets compared to purebred animals. While hybrids outperformed their local counterparts by 12.7% in this indicator.

In all groups, high safety of animals during the rearing period was revealed. In purebred groups, it averaged 97.65%, in crossbreeds – 98.35%, and in hybrid animals – 98.7%. Despite the small difference, there is a tendency to increase the safety of piglets during crossing and hybridization, which further emphasizes the advantages of using heterosis in breeding programs.

Along with a general increase in productive traits as they move from purebred to hybrid forms, the influence of the mother breed on the growth rate of piglets was also revealed. In particular, the best indicators were demonstrated by animals in which landrace was used in the maternal line.

When comparing the growth rate of purebred animals of the parent terminal Line (Group 3 – PIC-337) and intraspecific hybrids (groups 6 and 7), it was found that the



birth weight of piglets in hybrids of Group 6 was lower by 5.6% compared to purebred animals of the PIC–337 line ($p<0.001$) and in hybrids of Group 7 – by 2.8% ($p<0.001$). The average daily growth in the suckling period was highly likely highest in Pure-Line young animals of the terminal line PIC – 337 (236 g), while in Group 6 it was lower by 12.7% and in Group 7 – by 11.4% compared to 3, which indicates an intermediate type of inheritance of this trait. Different growth rates also led to different masses of hybrid animals compared to pure-line PIC – 337, so it was less in Group 6 by 11.4%, and in Group 7 by 10.0% compared to Group 3. Also, during weaning, it was found that the weight of piglets of Group 7 was 7.24 kg, which exceeded the same indicator in Group 6 (7.12 kg) and indicates a certain manifestation of heterosis in Group 7.

In terms of growth intensity during the growing season, hybrids of Group 6 were inferior to pure–line hybrids. Thus, the average daily increase in Group 6 was 9.4% lower than the pure line indicator ($p<0.001$), while this indicator in Group 7 was 496 g, which is almost equal to the indicator of pure line PIC–337 (501 g), and exceeds the same indicator in Group 6 by 9.2%. This led to the fact that the absolute increase in Group 7 (24.30 kg) was almost at the level of PIC–337 (24.56 kg, 1.1% less), while in Group 6 it was 22.23 kg and was 10.5% lower compared to pure–line analogues. This determined the fact that the hybrids of Group 7 almost did not differ from the animals of the PIC–337 line in terms of the weight of piglets at the end of rearing, which turned out to be only 3.3% lower, while in animals of Group 6 this difference was 11.1% or 3.25 kg, which indicates different levels of combinational ability of such combinations

It is also important that the safety of piglets in hybrid groups 6 and 7 was higher by 2.1% compared to the pure line PIC–337 (98.7% vs. 96.7%), which is also a sign of heterosis, particularly in the viability of young animals.

Against the background of a constant rise in the price of feed resources, the most important indicator is the efficiency of using feed by animals of various breeding directions. Thus, during rearing, the average daily feed intake of purebred animals of maternal lines averaged 0.76 kg, while in piglets of the paternal genotype, this indicator was higher by 9.2% and amounted to 0.83 kg (Table 4).

Table 4.

Use of feed and its effectiveness by purebred and purebred piglets during rearing

Indicator	experimental groups		
	1	2	3
Average daily feed consumption, kg	0,77	0,75	0,83
Amount of feed eaten per rearing, kg	37,80	36,93	40,52
Feed conversion from 28 days to 77 days, kg	1,90	1,84	1,65

This, with the same duration of the rearing period, led to an 8.4% increase in the total amount of feed eaten during this period in animals of the terminal line compared to analogues of maternal lines. In our opinion, this, combined with high increments, indicates more active metabolic processes in animals of this line. This conclusion is confirmed by feed conversion data. On average, this indicator in maternal genotypes was 1.87 kg, while in the PIC–337 group, it was 1.65 kg, which is 11.8% less, and indicates better feed assimilation and higher biological efficiency of the terminal line.

Comparison of the effectiveness of feed use by local piglets (groups 4 – LW LW×L L, 5 – L×LW) and pedigree hybrids (groups 6 – (LW×L)×PIC–337, 7 – (L×LW)×PIC–337) in The growing time showed that the average daily feed intake of the hybrids was 0.83 kg, which is 9.9% more than that of the local ones. Overall, they ate



3.68 kg more, which is due to faster growth and higher nutrient requirements. At the same time, the feed conversion rate in hybrids was better – 1.75 kg against 1.79 kg in crossbreeds (an improvement of 2.2%), that is, they needed less feed to form 1 kg of growth. This confirms the effect of Heterosis and the economic feasibility of using hybrids (Table 5).

Table 5.

Use of feed and its effectiveness by local and hybrid piglets during rearing

Indicator	experimental groups			
	4	5	6	7
Average daily feed consumption, kg	0,76	0,75	0,80	0,86
Amount of feed eaten per rearing, kg	37,12	36,89	39,14	42,23
Feed conversion from 28 days to 77 days, kg	1,81	1,77	1,76	1,74

Comparison of purebred mother piglets and crossbreeds showed almost the same feed intake (0.760 and 0.755 kg/day, respectively). Total consumption in crossbreeds was 1.0% lower, and their conversion rate was 4.3% better than that of purebred animals of the parent breeds.

Comparative analysis of the effectiveness of the use of feed of purebred animals of the parent genotype and hybrids based on them during rearing shows that the average daily feed intake in animals of the parent line was 0.83 kg, while in hybrids of groups 6 and 7 it turned out to be 3.6% lower. In terms of the total amount of feed eaten during the rearing period, piglets of Group 6 ate it 3.4% less, while their counterparts from Group 7 consumed it 4.2% more compared to analogues of Group 3. In terms of feed conversion, purebred animals of Group 3 had an indicator of 1.65 kg, which is 6.7% better compared to hybrids of Group 6 and 5.5% better with animals of Group 7.

Comparative analysis of fattening indicators of pigs of the parent line PIC–337 relative to the average value of the mother breeds (great white and landrace) revealed significant differences in most of the studied parameters (Table. 6). Thus, the safety of livestock in the parent group was at the level of 98.62%, which was almost at the level of the average indicator of maternal lines and indicates an equally high level of animal safety, regardless of genotype.

The greatest advantages were found in terms of growth indicators. The initial live weight of PIC–337 piglets exceeded the average value of parent breeds by 22.07% ($p < 0.001$), which is associated with a higher growth rate of these animals in previous periods of ontogenesis. The growth rate of these animals was also higher during fattening. Thus, the average daily growth of pigs of the paternal line was dominated by 22.29% by the average indicators of maternal breeds (1124 g against 920.5 g) ($p < 0.001$), which led to their superiority in absolute growth during this period by 22.09% ($p < 0.001$) and led to an excess of these animals in live weight at the end of fattening – by 22.08 % ($p < 0.001$), and the average daily growth – by 22.29%, which highlights much more intensive growth. This growth rate ensured a faster achievement of the slaughter condition, which is confirmed by the age indicator of reaching a live weight of 120 kg. In PIC – 337, this age was 154.8 days, which is only 86.24% of the average for maternal breeds (177.55 days ($p < 0.01$ – 0.001)). Thus, animals of the terminal line reached the target weight 22–23 days earlier.



Table 6.

Preservation, growth rate and efficiency of feed of purebred and purebred pigs during fattening

Indicator	experimental groups		
	1	2	3
Number of pigs at the end of fattening, heads	145	145	143
Safety of fattening livestock, %	99,32	98,64	98,62
Weight of pigs at the beginning of fattening, kg	26,60±0,11	26,81±0,20	32,60±0,13 ^{bbb} <i>ggg lll mmm nnn ooo</i>
Weight of pigs at the end of fattening, kg	118,30±0,46	119,25±1,00	145,00±0,57 ^{bbb} <i>ggg lll mmm nnn ooo</i>
Absolute fattening gain, kg	91,70±0,37	92,43±0,82	112,40±4,64 ^{bbb} <i>ggg lll mmm nnn ooo</i>
Average daily gain from 78 days to 178 days, kg	917±3,60	924±7,69	1124±4,64 ^{bbb ggg} <i>lll mmm nnn ooo</i>
Age of reaching live weight 120 kg, days	178,9±0,72 ^{aaa} <i>bbb cc ddd ee efff</i>	176,2±1,42 <i>ggg ii jjj kkk</i>	154,8±0,62
Average daily feed intake during fattening, kg	2,52	2,46	2,73
Amount of fattening feed consumed, kg	252,3	246,2	273,1
Fattening feed conversion, kg	2,75	2,66	2,43
Fattening quality index	30,56	32,07	51,99

Animals of the parent line had an average daily feed consumption per Rhine of 2.73 kg, which is 9.21% more than the average value of the parent breeds (2.49 kg). The total amount of feed consumed on fattening animals of the PIC-337 line (273.1 kg) exceeded the average indicator of Mother breeds by 9.44 % (249.25 kg). However, despite the large volumes of consumption, the feed conversion in the paternal line was 8.62% better – 2.43 kg against the average value of 2.71 kg in the maternal forms, which indicates a higher efficiency of converting feed resources into live weight gain

Especially significant was the advantage of the parent line in terms of fattening qualities index. The indicator in pigs of the PIC-337 line was 51.99, which exceeds the average value of Mother breeds by 62.29%.

When comparing the indicators of safety, growth intensity and efficiency of feed use in cross-country and hybrid pigs during the fattening period (Table. 7). It showed that the safety of livestock in all groups remained consistently high, ranging from 99.3% to 100%. This indicates that there is no significant impact of breeding methods on survival in the process of fattening and creating optimal conditions for keeping animals.

At the beginning of fattening, hybrids had a weight 10.02% higher than crossbreeds, and their average daily growth exceeded the indicators of crossbreeds by 7.71% (1040.5 g; $p < 0.001$). This provided a 7.67% higher increase in live weight and a final advantage of 8.19% at the end of fattening, as well as a 9.5% reduction in the age of reaching 120 kg.

Hybrids consumed 6.1% more feed, but had a better 1.52% conversion rate and a 17.64% higher fattening quality index.

Between the hybridization variants, the best results were shown by animals of Group 7 – the initial weight of which was 7.48% more, the average daily and absolute gains of 1.18% and 1.84% higher, which provided a 3.08% higher final weight at the end



of fattening, and a 2.23% reduction in the age of reaching 120 kg. Despite a slightly higher feed intake of 0.75%, its conversion was more efficient by 1.15 %, which increased the fattening quality index by 4.77 %.

Table 7.

Preservation, growth rate and efficiency of feed of cross-breed and hybrid pigs during fattening

Indicator	experimental groups			
	4	5	6	7
Кількість свиней по завершенню відгодівлі, голів	146	148	147	148
Safety of livestock on fattening, %	99,3	100,0	99,3	100,0
Weight of pigs at the beginning of fattening, kg	27,53±0,22	27,83±0,11	29,35±0,10	31,54±0,10
Weight of pigs at the end of fattening, kg	123,45±1,11 <i>ccc hh</i>	125,16±0,52 <i>ddd iii</i>	132,45±0,47 <i>eee jjj qqg ttt</i>	136,54±0,44 <i>fff kkk rrr uuu vvv</i>
Absolute fattening gain, kg	95,92±0,73 <i>ccc hh</i>	97,33±0,37 <i>ddd iii</i>	103,10±0,31 <i>eee jjj qqg ttt</i>	105,00±0,34 <i>fff kkk rrr uuu vvv</i>
Average daily gain from 78 days to 178 days, kg	959±7,53 <i>ccc</i> <i>hh</i>	973±3,87 <i>ddd</i> <i>iii</i>	1031±3,11 <i>eee</i> <i>jjj qqg ttt</i>	1050±3,14 <i>fff</i> <i>kkk rrr uuu vvv</i>
Age of reaching live weight 120 kg, days	173,4±1,37 <i>lll</i> <i>rrr qqg</i>	171,7±0,71 <i>mmm ttt</i>	164,9±0,54 <i>nnn vvv</i>	161,2±0,58 <i>ooo</i>
Average daily feed intake during fattening, kg	2,53	2,54	2,68	2,70
Amount of fattening feed consumed, kg	252,8	254,2	267,9	270,2
Fattening feed conversion, kg	2,64	2,61	2,60	2,57
Fattening quality index	34,91	36,28	40,90	42,85

Comparison with pure-line pigs PIC–337 (Group 3) showed that hybrids had a higher safety (99.3–100.0% vs. 98.62%), but lower by 6.6–8.3% average daily and absolute increments. The final weight of hybrids (132.45–136.54 kg) was 5.9–8.7% lower, and the age of reaching 120 kg was 4.1–6.5% higher.

The average feed intake in hybrids (2.68–2.70 kg) almost did not differ from PIC–337 (2.73 kg), but the conversion rate was 5.8–7.0% worse, which led to a 17.5–21.3% decrease in the fattening quality index in hybrids compared to pure PIC–337 animals.

So, hybrids with the participation of PIC–337 are characterized by high safety and close to pure–line feed consumption levels, but have lower growth rates and feed efficiency. This indicates an intermediate inheritance of traits and confirms the feasibility of using hybrids in intensive pig breeding systems, considering their genetic characteristics.

Discussion. Our conclusions regarding the fact that purebred pigs of the mother breeds of large white and landrace breeds are characterized by relatively stable growth rates, and higher values of fattening productivity were achieved by pigs of the landrace breed compared to Animals of large white breed when purebred their breeding coincided with reports (Kremez M. et al., 2024), who claim that Landrace pigs outnumbered their peers of the large white breed in terms of average daily increments of 4.1%, and 4.0% in



terms of live weight of piglets at the end of the period and the information described in the paper (Collins C. L. et al., 2017). At the same time, they contradict the message (Santiago G. et al., 2022), which did not establish significant differences in the productivity of excellent white and Landrace pigs during fattening, and statements (Bergamaschi M. et al., 2022), who reported that purebred pigs of large white breed had a higher average daily increase of 4.4% compared to analogues of the Landrace breed, while the feed conversion rate was better by 10–15% in animals of the Landrace breed. They also do not match the information (Baranovsky D. & Tkachuk O., 2024), which indicate that Landrace pigs were inferior to their peers of the large white breed in terms of growth rate at 6 – by 2.4%, and at 8 months – by 1.5%.

Our conclusions that purebred pigs of the mother breeds of large white breed and Landrace are inferior to their local counterparts in terms of growth intensity by 3–6% and feed conversion by 4.3% are identical to the reports (Baranovsky D. & Tkachuk O., 2024; Lisnyi V. A. & Nazarenko I. V., 2002; Chernenko O. M. et al., 2022; Dudka E. I., 2019), but contradict the statements (Kremez M. et al., 2024) that crossbreeding animals obtained as a result of direct and reverse crossing of these breeds did not have significant differences in growth intensity indicators, but they were characterized by a higher feed consumption by 0.7–4.8% and at the same time showed an effective 2.2–5.3% feed payment in increments compared to the original parent breeds.

The results obtained by US are entirely consistent with the scientific data on the advantages of the parent terminal line PIC–337 for intra–line breeding over animals of the mother breeds by 22.0% in terms of growth rates during rearing and fattening, by 11.8% in terms of feed efficiency and have a reduction in the duration of fattening by 21–23 days with the data (Kremez M. et al., 2024; Genetic Update Programs, 2025).

Our conclusions regarding the fact that hybrid animals (LW×L)×PIC–337 and (L×LW)×PIC–337 show a significant advantage over local animals in terms of growth intensity during rearing and fattening and have better feed efficiency, coincided with reports (Chernenko O. M. et al., 2022; Baranovsky D. & Tkachuk O., 2024; Kasper C. et al., 2020; Liu S. et al., 2023), but not consistent with the reports (Nielsen B. & Velandar I., 2016), who in their studies, when comparing the fattening performance of purebred Duroc pigs and their D(LY) – Duroc × (Landrace × Yorkshire) hybrids, did not find a significant difference in the average daily weight gain of purebred and hybrid animals.

Our reports that a more effective combination in hybridization is the combination of (L×LW)×PIC–337, combining high increments, optimal feed conversion, and reduced fattening time, which leads to an increase in overall production efficiency, partially coincided with the conclusions made in their studies (Kremez M. et al., 2024).

Thus, according to the results of our research, using purebred pigs of the parent line allows achieving maximum growth rates and the best feed conversion. Still, hybridization provides better preservation of young animals and a large number of nests, which is a significant factor in increasing the overall productivity of pig breeding.

Conclusions.

1. Relatively stable growth indicators characterize purebred pigs of the mother breeds of the large white breed and Landrace. Still, they are inferior to local and hybrid analogues regarding growth intensity and feed efficiency.

2. Pigs of the parent terminal line PIC–337 for intra–line breeding predominate animals of the mother breeds by 22.0% in terms of growth rates during rearing and fattening, by 11.8% in terms of feed efficiency, and have a reduction in the duration of fattening by 21–23 days.

3. Crossbred animals (LW×L and L × LW) exceed purebred analogues in all the main economically advantageous characteristics, particularly in terms of live weight by



3–6% and feed conversion by 4.3 %.

4. Hybrid animals – (LW×L)×PIC–337 and – (L×LW)×PIC–337 show a significant advantage over local animals in terms of growth intensity during rearing and fattening, and have better feed efficiency.

5. A more effective combination in hybridization is the combination of (L×LW)×PIC–337, combining high increments, optimal feed conversion, and reduced fattening time, which increases overall production efficiency.

6. Using purebred pigs of the parent line allows you to achieve maximum growth rates and the best feed conversion. However, hybridization provides better preservation of young animals and a large number of nests, which is a significant factor in increasing the overall productivity of pig breeding.

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