DOI: 10.12731/2658-6649-2022-14-4-335-353
UDC 338.43

MAIN CHALLENGES OF THE COVID-19 PANDEMIC IN THE BERRY INDUSTRY

N.N. Levkina, E.I. Mitnitskiy

The emergence and development of a new coronavirus infection and the pandemic that followed caused global changes in all sectors and areas of human activity. Agriculture in different countries and regions has fully felt the consequences of the restrictions imposed. Statistical data on the state of agriculture of the Russian Federation, including crop production, and in the context of farm categories indicate that this real economy sector was not significantly affected by the crisis of 2020. However, the impact of the crisis is extremely uneven depending on the category of products grown and will manifest itself for more than one year. This paper is devoted to analyzing the main problems faced by Russian agricultural producers specializing in berry cultivation in connection with the COVID-19 pandemic on the example of the Tula Yagoda Corporate Group (Tula Yagoda Group). The research aims to identify, summarize, and systematize the main challenges of the COVID-19 pandemic in the berry industry in the form of a scheme. The analysis of the actual operation results, tactical and strategic difficulties of the Tulskaya Yagoda Group allowed us to conclude that the impact of the pandemic and related restrictions affected all stages of berry production (supply, production, and sale), as well as the prospects for its development. The COVID-19 pandemic has revealed the most vulnerable areas of the berry farms' operation and will have long-term consequences, which can be partially offset by rational adjustments to the volume of cultivated land, their processing technology, types, and varieties of cultivated crops, etc. For the enterprises of this industry to continue to function and develop effectively, it is necessary to strengthen the positions of the Russian arboretums, optimize the use of labor resources, as well as provide state support not only for agricultural producers in case of another pandemic but also representatives of related industries.

Keywords: *agriculture; berry farm; pandemic; COVID-19*

For citations. *Levkina N.N., Mitnitskiy E.I. Main Challenges of the COVID-19 Pandemic in the Berry Industry. Siberian Journal of Life Sciences and Agriculture, 2022, vol. 14, no. 4, pp. 335-353. DOI: 10.12731/2658-6649-2022-14-4-335-353*

ОСНОВНЫЕ ВЫЗОВЫ ПАНДЕМИИ COVID-19 В ЯГОДНОЙ ОТРАСЛИ

Н.Н. Левкина, Е.И. Митницкий

Появление и развитие новой коронавирусной инфекции и последовавшая за этим пандемия повлекли глобальные изменения во всех отраслях и направлениях деятельности людей. Сельское хозяйство разных стран и регионов в полной мере ощутило последствия введенных в связи с пандемией ограничений. Статистические данные по состоянию сельского хозяйства РФ, в т.ч. растениеводства, в целом, а также в разрезе категорий хозяйств свидетельствуют о том, что данный сектор реальной экономики кризис 2020 года затронул незначительно. Однако влияние кризисных явлений крайне неравномерно в зависимости от категории выращиваемой продукции и будет проявляться не один год. Настоящая работа посвящена анализу основных проблем, с которыми столкнулись сельхозпроизводители, специализирующиеся на выращивании ягод, в Российской Федерации в связи с пандемией COVID-19 на примере Группы компаний «Тульская ягода» (ГК «Тульская ягода»). Цель исследования – выявить, обобщить и систематизировать в виде схемы основные вызовы пандемии COVID-19 в ягодной отрасли. Анализ фактических результатов деятельности, тактических и стратегических сложностей ГК «Тульская ягода» позволил сделать вывод о том, что влияние пандемии и связанных с ней ограничений затронуло все стадии производства ягод (снабжение, производство и реализация), а также перспективы развития хозяйства. Пандемия COVID-19 выявила наиболее уязвимые направления деятельности ягодных ферм и будет иметь долгосрочные последствия, которые можно частично нивелировать путем рациональной корректировки объема возделываемых земель, технологии их обработки, видов и сортов выращиваемых культур и т. п. Для того чтобы предприятия данной отрасли продолжали эффективно функционировать и развиваться, необходимо укрепление позиций отечественных питомников, оптимизация использования трудовых ресурсов, а также государственная поддержка не только сельхозпроизводителей на случай повторения пандемии, но и представителей смежных отраслей.

Ключевые слова: *сельское хозяйство; ягодная ферма; пандемия; COVID-19*

Для цитирования. *Левкина Н.Н., Митницкий Е.И. Основные вызовы пандемии COVID-19 в ягодной отрасли // Siberian Journal of Life Sciences and Agriculture. 2022. Т. 14, №4. С. 335-353. DOI: 10.12731/2658-6649-2022-14-4-335-353*

Introduction

A new coronavirus infection has made one fact clear: it will never be as it was before. A significant number of existing stereotypes, approaches and behavioral patterns of the population have been reconsidered [4]. As for economic entities, their functioning conditions and operating results have changed radically. So, in many cases, the criterion for successful work in the past year was not the receipt of increased financial results compared to the previous period, but simply gaining some profit. Sometimes just continuing to operate, even with losses, was considered a success. That is because a significant number of small and medium-sized enterprises ceased to exist [10].

The agricultural sector of the Russian Federation has also felt the impact of the pandemic, but to a lesser extent compared to other economic sectors [9]. According to the Rosstat data, this industry even showed growth compared to the previous year, but the situation in certain areas of agricultural production, farm categories, and product types differs significantly [14]. Moreover, all consequences of the 2020 crisis will only manifest themselves in the coming years.

The berry industry in the modern Russian economy is a fairly young direction of agricultural activity since it has appeared anew - the number of economic entities operating based on farms established in Soviet times is fairly small. The area of berry fields in Russia has decreased annually since 1996 (from 170.7 thousand hectares in 1996 to 99.1 thousand hectares in 2020) [15]. Many nuances in the work of such farms are connected with this. In particular, there is a total shortage of high-quality planting material in the country, and the vast majority of it is imported. The same can be said about fertilizers, certain types of equipment and inventory, and means of protecting plants and crops from diseases and pests.

These examples explain the strong dependence of agricultural producers on changes in the global economy: currency fluctuations, sanctions against Russia and retaliatory sanctions, etc. It would seem that all this has become a common test of resilience, but the COVID-19 pandemic and related restrictions in the Russian Federation and around the world have presented new challenges to Russian agriculture in general and berry producers in particular.

Currently, a significant number of studies are devoted to assessing the impact of COVID-19 and its consequences on agriculture in the world as a whole [23; 24; 25] and in the specific countries [3; 7; 17]. Of the greatest practical importance are studies of the coronavirus crisis consequences in specific agricultural sectors and the regions [5; 11; 16; 20; 22]. Several publications are aimed at analyzing the consequences of the pandemic for small agricultural businesses [19; 21]. A. Petrikov considers the development of small and medi-

um-sized businesses as one of the major priorities of agricultural policy in the post-pandemic period [12]. At the same time, without a thorough analysis of the challenges that the COVID-19 pandemic has presented to producers of certain crops due to the specifics of their farms, it will be difficult to ensure their survival, not to say further development. However, there are no such studies concerning the berry industry.

Materials and methods

The purpose of this study is to identify, generalize and systematize the main problems that the berry industry had to face during the COVID-19 pandemic in the form of an illustrative scheme. To do this, the following tasks were consistently solved:

- Analysis of scientific publications on the COVID-19 impact on the agricultural industry and its areas;
- Study of the Rosstat data on agriculture, including crop production, and namely on fruit and berry plantations for the period from 1990 to 2020;
- Analysis of the features and results of the Tulskaya Yagoda Group operation in 2020 and identification of its main current and future problems caused by the COVID-19 pandemic and related restrictions;
- Generalization of the main COVID-19 challenges identified by the example of the Tulskaya Yagoda Group in the Russian berry industry and their systematization in the form of a scheme.

The theoretical and methodological basis of the study were the works of Russian scientists studying the consequences of COVID-19 for the agricultural sector, general scientific methodology, economic and mathematical methods.

The info-empirical basis of the study includes data from the Federal State Statistics Service of the Russian Federation (Rosstat), materials of conferences held by the Berry Union NPO, info-analytical portals on the Internet, and as data characterizing the Tulskaya Yagoda Group operation and its results for 2020.

Tulskaya Yagoda Group is located in Chebyshovka village of Odoyevsky district of the Tula region and specializes in growing premium-class berries – honeysuckle, blueberry, garden strawberry, raspberry, gooseberry, and currant. The company sells its goods not only on the territory of the Tula, Kaluga, and Moscow regions through direct sales, but also supplies large federal retail chains. Purchasing most of the planting material abroad, being an active member of the Berry Union of the Russian Federation, and an active participant in international conferences and other events for berry producers from all over the world, it has fully experienced all the changes that the pandemic period brought.

The aim and tasks of this work led to the predominant use of qualitative research methods that made it possible to describe and interpret the data collected based on the Tulskaya Yagoda Group.

In the research, such general logical methods of cognition as analysis, synthesis, generalization, and induction were used. Such empirical general scientific methods as observation, description, and measurement were used to collect the initial information for analysis [6]. To assess the dynamics of individual performance indicators of the Tulskaya Yagoda Group, we used traditional methods of economic analysis, including comparison, calculation of average and relative values.

Results. The analysis of publications on the impact of the COVID-19 pandemic and its consequences on Russian agriculture carried out within the framework of the study allowed us to conclude that there are no such studies about berry production, which confirms the relevance and scientific novelty of the research topic.

The analysis of the Rosstat data on fruit and berry plantations showed that in the conditions of negative dynamics of the total perennial berry plantations area, there is a significant increase in the area of berry fields belonging to peasant farms and individual entrepreneurs (Fig. 1) [15]. Data on the gross berry harvest in such farms also show an upward trend (Fig. 2) [14].

The data presented in Figs. 1 and 2 indicate that the production of berries by peasant farms and farms of individual entrepreneurs is developing dynamically. To preserve these positive trends, it is important to promptly assess external and internal threats and take adequate measures to eliminate or reduce their consequences.

Tulskaya Yagoda Group is a typical representative of a peasant farm specializing in the cultivation of berries. Based on its operation data for 2020, the main problems of the berry industry in the conditions of the COVID-19 pandemic and related restrictions were identified with a view to their subsequent generalization and systematization in the form of an illustrative scheme.

The first and, in many ways, the most significant challenge of the coronavirus for the berry industry is the closure of borders, which affected several significant aspects of the berry farms' operation at once.

First of all, the closure of borders with neighboring states caused problems with the labor force provision of berry farms. Traditionally, agricultural enterprises demand immigrants from Uzbekistan, Tajikistan, etc.; they are distinguished by high working capacity, endurance, responsibility, and discipline.

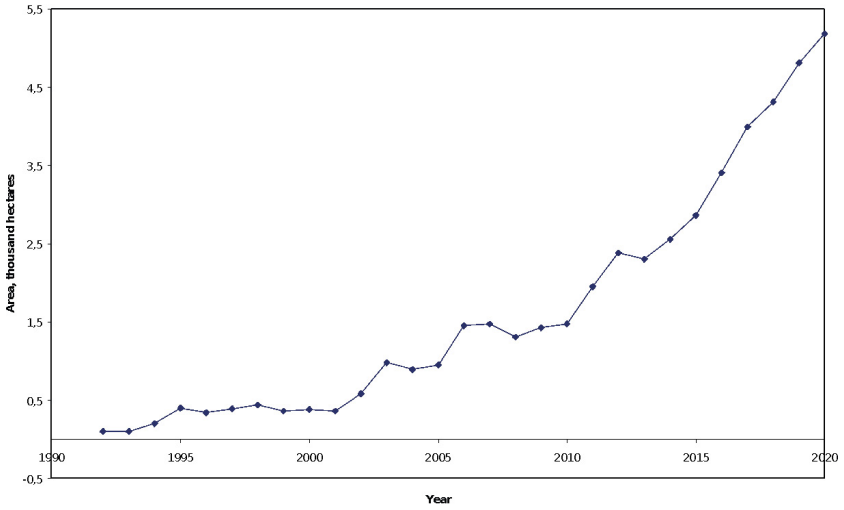

Fig. 1. Dynamics of the berry fields area of peasant farms and individual entrepreneurs for 1992–2020

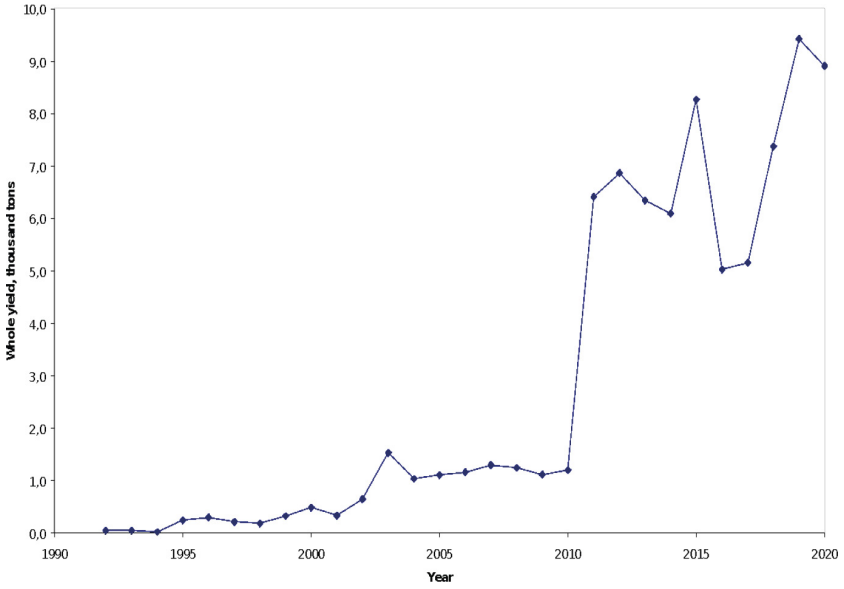

Fig. 2. Dynamics of the gross berry harvest in peasant farms and farms of individual entrepreneurs for 1992–2020

The inability to invite seasonal workers from abroad revealed the deep problems of using hired workers in the berry industry. The difficulties are since, for the most part, agricultural lands are located in ecologically clean areas, away from big localities, as well as the specifics of the work of harvesters. To the greatest extent, this problem has affected mono-producers specializing in one or two types of berries (for example, raspberries and blackberries) grown in large areas. Simultaneous ripening of the crop requires a large number of workers. However, they will not be employed all season, which is unprofitable for applicants for such vacancies (employment for the whole season is preferable) and employers (if, as in the case of raspberries, fruiting begins in the second half of summer, most of the workers will already be employed in other farms).

Contrary to the opinion of many Russians that immigrant workers take away their jobs, causing unemployment and a decrease in the quality of life of many families, they often effectively fill in the gaps in the labor market that arise due to the unwillingness of Russian residents to work in heavy, low-prestige jobs [13]. So, the Tulskaya Yagoda Group tried unsuccessfully to attract locals to work on their farms before the pandemic. In the absence of foreign employees, even the increased wages could not encourage the "tired of unemployment" residents of the nearest localities to work.

In the Tulskaya Yagoda Group, as in many other efficient farms, the berries grown are selected not only from a position of their market demand, their commodity properties, etc. but primarily from the point of view of the labor resources optimal use. The types of berries grown, their varieties (early, medium, late, remontant) are selected in such a way that during the period when the harvest of one crop ends, the active fruiting of another begins. This ensures an even workload for berry pickers, the required number of which is important to calculate in advance based on the planting areas and crops used, their varieties, and ripening dates.

However, even in the case of hiring an optimal number of employees determined by careful analysis at the beginning of the season, there may be situations when an additional labor force is required. So, in the Tulskaya Yagoda Group, most of the land was allocated for the cultivation of raspberries, and during its active fruiting, the established team of berry pickers was not enough, which forced the management of the berry farm to hire additional teams of workers from Dagestan, who were distinguished by low productivity.

The work specifics of berry farms are that one needs to work from early morning to late evening during the ripening of berries. The peculiarities of berry crops (their tenderness, high susceptibility to the conditions of collection, stor-

age, transportation, etc.) require special conscientiousness and precision from fruit pickers – unproductive breaks (smoke breaks, etc.) and haste to increase the number of berries collected are unacceptable here.

It should be emphasized that the harvesting automation level in the berry industry is extremely low. That is both because of the special tenderness of the crops grown and because of the high equipment costs and serious requirements for agricultural technology (row spacing, distance between plants, their height, etc.).

In the Tulskaya Yagoda Group, an attempt has been made to mechanize only the collection of honeysuckle. Being one of Russia's leading honeysuckle producers, the farm became interested in the possibility of mechanized berry picking. Having studied the experience of European blueberry producers, the masters of the Tulskaya Yagoda Group assembled a combine harvester for non-contact honeysuckle harvesting; however, this unit can be effectively used only for varieties of simultaneous berry ripening. At the same time, most of the berries grown on the farm have a time-stretched fruiting and are harvested by hand because when collecting ripe berries, it is important not to damage unripe ones and inflorescences.

These features explain the inefficiency of attracting people to berry picking on an irregular basis (with payment being a part of the harvest or collection for the subsequent purchase) - as a rule, the damage from careless inexperienced pickers significantly exceeds the savings from using farm's employees. The experience of the Tulskaya Yagoda Group in attracting students to berry picking also turned out to be ineffective.

The second aspect of the border closure problem is the difficulties with the supply of planting materials, fertilizers, plant protection means, equipment from abroad (trucks detained at the borders, the inability of suppliers to send already ordered goods, etc.). As a result, insufficient loading of berry farms, substandard fulfillment of agrotechnical requirements, lost harvest, and the threat of losing berry supply contracts. All the traditional risks associated with weather conditions were also present. It is safe to say that the situation in 2020 was very unfavorable for the agricultural industry.

Thus, the COVID-19 pandemic primarily affected the supply of berry farms with labor and material resources (seasonal workers, imported planting material, fertilizers, plant protection means, agricultural machinery, and inventory of foreign production, etc.). As a result, a difficult situation has also developed with financial resources - on the one hand, the costs of finding and hiring employees have increased, on the other hand, a reduction in the supply of these resources has led to a sharp increase in prices for them.

The production process on berry farms has also been negatively affected. The closure of borders due to pandemic restrictions eventually caused a shortage in the labor force, which led to the under-harvesting of individual crops and colossal losses of berry producers. So, in the Tulskaya Yagoda Group, tons of berries remained on the bushes because, for example, it was necessary to stop harvesting honeysuckle when the main harvest of garden strawberries began. In addition, more than 3 hectares of raspberries were mown down at the peak of fruiting, resulting in losses of more than 20 tons of raspberries. To avoid a recurrence of this situation in the future, even more careful planning of planting berry plantations is necessary. In the Tulskaya Yagoda Group, it was decided to change the cultivated crops ratio.

Also, the shortage of workers on berry farms affected the quality of planting processing, care for them, etc. In many farms, planned reconstructions and modernizations had to be abandoned, not only because of the lack of labor force but also because of the increase in prices for many goods and difficulties in attracting borrowed funds. In several farms, losses were caused by a shortage of planting material (not all areas allocated for berry cultivation were planted), insufficient plant protection and care for them - hence the loss of part of the crop from diseases and pests.

Berry farmers also experienced significant difficulties when selling the harvested crop. On the one hand, the incomes of the population who have been in self-isolation for a long time and lost their jobs due to the pandemic and related restrictions have decreased. In this case, those farmers who were actively working on expanding the geography of supplies, engaged in direct sales, looking for customers through social networks, etc., turned out to be more successful. In the current situation, the use of intermediaries in retail sales significantly increased the cost of sales and the risk of losses as a result of a longer delivery time of products to consumers.

It should be noted that last year many berry farms thought about the need to organize the processing of harvested berries. This would make it possible to optimize transportation costs, minimize returns of substandard products, process excess berries instead of selling them at less favorable prices, etc. Processing options are freezing berries, drying them, or producing jams, compotes, etc.

The delivery of berries to customers is a particularly important stage of the producers' work. Berries are delicate, perishable goods, very sensitive to the time and conditions of collection, storage, packaging, and transportation. Accordingly, farms need to have transport with the appropriate equipment (refrigerators) or sign contracts with transport companies.

The first method has obvious advantages – cars can depart with fresh crops as they are loaded, the routes of each vehicle are determined by the berry farm management and can be easily adjusted if necessary. Work with a transport organization is associated with logistics difficulties, inflexibility of contracts, which, combined with the usual territorial remoteness of berry farms from cities with a developed network of transport companies, is in most cases economically unprofitable.

It should be noted that a pick-up directly from the production site is also an option. But it will be attractive for retail customers only if an excursion service or a developed infrastructure (photo zones, cafés, souvenir shops, etc.) is organized on the territory.

The specifics of berry sales to wholesalers and chain stores in 2020 were determined, on the one hand, by the growing interest of the population in healthy and natural nutrition, on the other hand, by difficulties with the supply of imported fruit and vegetable products. Therefore, those farms that had established supplies to chain stores were in a more advantageous position.

It should be emphasized here that the retail chains impose rather strict requirements on berry products suppliers. The requirements relate directly to the quality of berries, the temperature regime of their storage, and special packaging – these should be plastic containers, cardboard packaging, or wooden boxes. Some chains have developed quality certificates for each type of berries purchased.

Such situations when the coronavirus and related restrictions affected the interests of berry producers indirectly through enterprises of related industries should be noted as well. In particular, we are talking about tare and packaging suppliers and buyers of berry products such as cafes, restaurants, and confectioners. Public catering companies have fully felt the impact of coronavirus restrictions. Many of them were forced to close, thereby depriving berry farms of one of the areas of sale of the grown crop and a source of income.

The problems identified in the analysis of the Tulskaya Yagoda Group operation for 2020, which arose in connection with the COVID-19 pandemic, were summarized and systematized in the form of a scheme presented in Fig. 3.

As can be seen from Fig.3, the main difficulties of berry producers due to the pandemic are closely interrelated with each other. Difficulties with the supply and sale of crops, problems in related industries cause changes in production.

Thus, the conducted research made it clear that the challenges of the COVID-19 pandemic in the berry industry affected all stages of this agricultural production type: difficulties with the supply of necessary resources (their shortage and increased cost) created certain peculiarities in berry production

and sale in 2020. They led to crop and income losses, as well as adjustments to not only current but also long-term plans of berry farms.

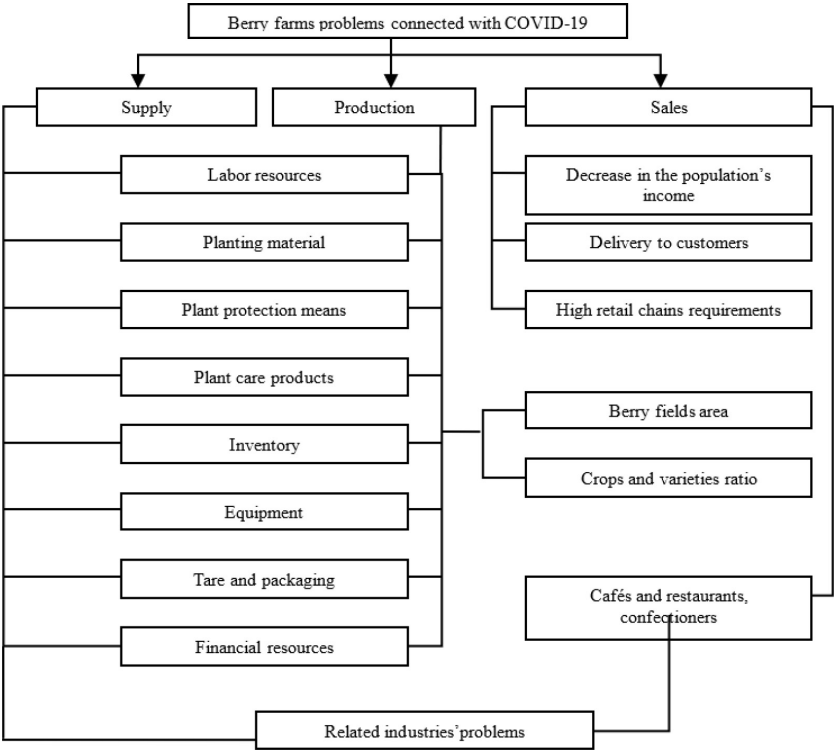

Fig. 3. Main problems of the berry farms connected with COVID-19

Discussion

The results obtained in the course of the study show that even though the self-sufficiency level in berries is still low in Russia (the normative value of this indicator for ensuring food security for fruits and berries is at least 60%) [18], and that there is a "roadmap" for the accelerated development of fruit and berry production until 2023 [1], the damage caused to the country's economy by the COVID-19 pandemic is huge and it will grow. Therefore, one may not expect significant state support in solving the berry industry problems identified as a result of the study. In many ways, the prospects of berry farms will depend on the rationality of their own management decisions.

In 2021, the problem of providing agricultural producers with seasonal labor resources has not only not disappeared but has also worsened since the borders are still closed, and those few migrants who stayed in Russia during the last season returned home in winter, and they can no longer come back. Experts say that the approximate need for foreign seasonal workers in the agricultural sector is about 40 thousand people. According to Berry Union NPO, Russian berry farms need to attract about 6-10 thousand people [8].

The situation is complicated by the fact that according to the new procedure for attracting foreign workers to the country, only enterprises with certain performance indicators (the number of employees is more than 250 people, annual income is more than 2 billion rubles) can do this on a declarative basis for a certain project – the absolute majority of berry producers do not meet these criteria [8]. According to the *Minutes of the Meeting of the Operational Headquarters for the Prevention of the Importation and Spread of a New Coronavirus Infection on the Territory of the Russian Federation* (April 23, 2021 № 8kv), these criteria have been reduced to 101 people and 800 million rubles accordingly, however, they are still high [2].

As a result, many berry farms have already abandoned plans for new plantings. They are going to develop smaller areas compared to the planned level. Thus, an indirect confirmation of the massive reduction in the planting of garden strawberries is the appearance on the market of a large amount of pre-ordered planting material, This delicious berry requires the largest number of pickers and in conditions of their shortage, the harvest is under threat.

Since in berry farms the share of operating costs for the labor remuneration of seasonal workers is quite high (from 50 to 75%), berry producers should approach the problem of a labor shortage as responsibly as possible. The Tulskaya Yagoda Group has developed a whole range of measures to increase the harvest with a constant number of pickers, including:

- Selection of crops considering the timing of fruiting and single/multiple harvesting;
- Selection of varieties of each crop based on the timing of fruiting (for example, late varieties of honeysuckle interfere with the harvest of garden strawberries);
- Use of technologies allowing to increase the convenience and speed of collection (trellises, tabletops, shelters, carts, grassing, special equipment, involvement of support personnel);
- Introduction of employee motivation systems aimed at maximizing the intensification of high-quality berry picking.

In conclusion, it should be noted that the difficulties faced by berry producers last year also revealed the pressing problems of state support for the berry industry. It is not only about helping with financing but also taking effective measures at the state level to develop Russian crop breeding, production of plant protection means, agricultural equipment, training of qualified personnel, etc.

Conclusion

Thus, the result of the study was the identification of the main challenges of the new coronavirus infection in this branch of agriculture, their generalization, and systematization in the form of an illustrative scheme, using the example of a specific berry producer - Tulskaya Yagoda Group. The COVID-19 pandemic and related restrictions have had a significant impact on all operation stages of agricultural producers specializing in berry cultivation: supply, production, and sales, as well as on the development strategy of these farms for the coming years. The prospects for the berry industry development in Russian agriculture will depend not only on the timeliness and adequacy of decisions taken by each economic entity but also on the scale of state support.

The theoretical significance of the study is to expand the scientific understanding of the COVID-19 pandemic impact on a specific branch of agriculture – berry production.

The practical value of the conducted research lies in the generalization and systematization of the main problems that the berry industry had to face during the COVID-19 pandemic in the form of an illustrative scheme. This information can be useful to berry producers to adjust current and long-term plans, considering possible real or potential difficulties.

The research results will allow one to assess further the possibilities of optimizing the berry farms' operation in their most vulnerable aspects. The results will also allow optimizing the set of necessary measures to support the berry industry.

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Поступила 25.03.2022 Received 25.03.2022
После рецензирования 01.04.2022 Revised 01.04.2022
Принята 17.04.2022 Accepted 17.04.2022