

ных удобрений (КАС).

В связи с выше изложенным возникает необходимость в расширении существующего ассортимента гербицидов за счёт современных высокоэффективных комбинированных препаратов, в том числе против многолетних сорных растений.

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СТАНДАРТЫ КАЧЕСТВА ПИЩЕВОЙ СОИ В ЯПОНИИ - ПЕРСПЕКТИВЫ ДЛЯ РОССИЙСКОГО ЭКСПОРТА

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Японские рынки состоят из двух производственных процессов - рынка, который производит соевую муку и соевое масло и продовольственного рынка, посредством которого соя перерабатывается в такие продукты, как тофу, мисо и натто, и продается на продовольственном рынке. Эти рынки склонны по-разному оценивать физические и суцностные характеристики сои. В данной статье мы стави-

ли целью внести ясность в вопрос о японском рынке соевых продуктов, их стандарты и потребности в качестве сои.

Ключевые слова: соя, пищевая промышленность, стандарты на пищевые продукты, Япония

DEMAND FOR RUSSIAN SOYBEAN BASED ON THE NEEDS OF FOOD INDUSTRY IN JAPAN

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Japanese markets are consisting of two production processes - market which produces soybean meal and soybean oil and the food market whereby soybeans are processed into products such as tofu, miso and natto, and sold in the food market. These markets tend to value the physical and intrinsic characteristics of soybeans differently. In this paper we aimed to clarify Japanese soybean food market, their standards and needs in soybean quality.

Keywords: *soybean, food industry, food standards, Japan*

Japan's need for soybeans for oil, soybean products and meal may be tighter than expected because of limited domestic supply capacity for the commodity. Japan is one of the biggest importers of soybeans in the world [2]. Japan grows only about 10% of the soybeans consumed in the country each year [4]. Key soybean suppliers to the market are the US, Brazil, Canada, China and domestic production (Fig. 1). Imported soybean from these four countries is more than 99 % of the total import [9].

It should be noted that all imported soybean products must be certified for Identity Preserved (IP) handling. IP handling involves the separate management of genetically modified agricultural products and non-genetically modified agricultural products at each stage of farming, distribution, and production to prevent contamination. At each stage, documents proving the nature of their management are

created, making it clear that each product was separately managed [3].

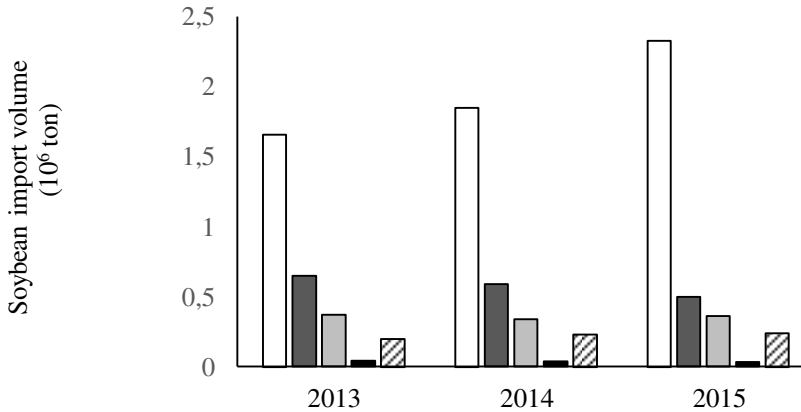


Figure 1 – Exporters of soybean to Japan (Source: Ministry of Finance Japan, 2018)

Japanese soybean processors demand high quality beans, especially for soy food products, and thus, favor domestic and US soybeans [10]. As Japan’s soybean production declines and farmers retire, secure and efficient access to soybeans from US and Brazil will become even more essential to meet domestic demand for the commodity [11].

Total soybean usage for food purposes is around 1 million tons annually. Total soybean demand (food and crushing) is around 3,2 million tons [5]. Demands from consumers become more diversified, more difficult to predict and to some extent more expensive to service as demand for convenience and freshness is resulting in smaller, more frequent purchases. All food beans used in the market must be non-GMO [11].

The demand for edible soybeans is met almost entirely by imports. Today imports account for 760,000 tons or around 73 % of total usage [10]. This is due to the domestic production of soybeans declining, a result of both higher costs of production and changes in Government subsidies that have tended to encourage rice production at the expense of soybeans [5].

The demand for soybeans for food purposes has remained virtually static over the past decade. One of the most popular Japanese health foods is tofu produced from soybeans. Beans for tofu account for over 50 % of total usage and the three major uses – tofu, natto and miso – account for around 80 % of total usage. Tofu and miso are consumed every day by Japanese, while natto is a more regional food.

Tofu is made of solidified soymilk. The type of soybean required for tofu is one that has a high protein content more than 37 % (44–45 % dry basis) and preferably a low oil content; large seed size to improve water absorption - has a 100-seed weight of 20 grams or more and a minimum diameter of 6.3...7.0 mm; high germination (more than 95 %) – necessary to produce hard tofu and provide a strong taste [8].

Miso is fermented, and salted soybean paste. The ideal miso bean is a mix of tofu and natto quality specifications. The type of soybean required for miso is one that has a large seed size; relatively high protein; high sugar content; light hilum soybean, with a thin hull that is not cracked [1].

Natto is an ethnic Japanese food of fermented whole soybeans. Natto soybeans are characterized by small seed size, which can be a maximum of only 5.5 mm diameter. Natto soybeans must also have a clear hilum, thin seed coat, and high carbohydrate content [6].

Each food product derived from soybeans requires specific soybean characteristics including protein content, size, color, and weight making the food market for soybeans more complex. However, the most crucial characteristic of soybean is size of seeds. As tofu is the

most popular food in Japan, the most valuable size of seeds is large (Fig. 2) [6].

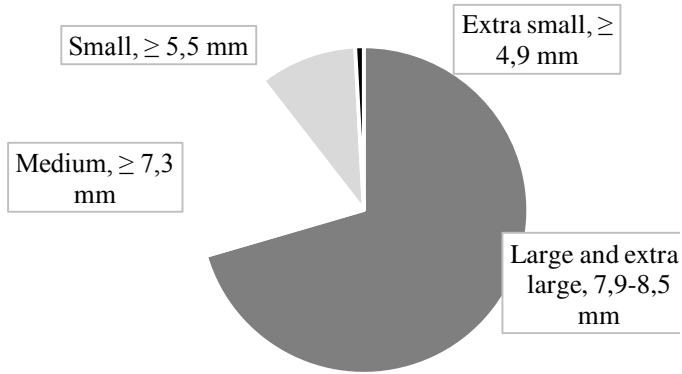


Figure 2 – Domestic soybean classification by size (Source: Ministry of Agriculture, Forestry and Fisheries, 2018)

Also, it is important to specify the desirable qualities of soybeans in each type of processing. However, it would be equally important to identify the interactions between cultivars and cultural conditions in Russia, each of which may influence the soybean qualities in a different manner.

Regarding the chemical composition, protein, protein components such as globulins (11S, 7S) and their ratio, amino acids, linoleic acid, raffinose and stachyose contents are influenced mainly by cultivars. In relation to the growing conditions, carbohydrate, total sugar, free type of total sugar, pinitol, sucrose, ash, phosphorus and calcium are influenced by locations [6].

The key consumer driver in Japan is health and buyers are seeking product that is non-GMO as this is related to safety and healthi-

ness of products. The demand for non-GMO soybeans is increasing as local bean production declines.

Russia is the world-largest market where cultivation and breeding of genetically modified plants are prohibited by law [7]. Strategic GMO-free agriculture combined with rich soil resources make Russian soybeans able to occupy the highest price niche in the Japanese market should the quality issues be solved. After modernization of technology and introducing IP-handling, Russia will be able to expand the highest quality soybean export and become a competitive seller on the Japanese market. Potentiality of Russian soybean is very high. Japanese market and new trade possibilities are worth considering by Russian farmers.

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ВЛИЯНИЕ ГУСТОТЫ СТОЯНИЯ РАСТЕНИЙ СОИ НА СТРУКТУРУ ПРОДУКТИВНОСТИ КУЛЬТУРЫ

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В статье представлены результаты исследований по влиянию густоты стояния растений сои сорта Иван Караманов на структуру продуктивности и урожайности зерна. В условиях Среднего Приамурья, при узкорядном возделывании сои на грядах с основанием 140 см оптимальная густота составляет 500 тыс. раст./га, которая обеспечивает урожайность 49,8 ц/га при средней продуктивности растений сои 10,0 г. При широкорядном возделывании оптимальная плотность стеблестоя растений сои составила 300 тыс. раст./га, обеспечивающая урожайность 39,8 ц/га.

Ключевые слова: соя, урожайность, густота стояния, Среднее Приамурье, компенсаторная реакция, продуктивный узел.

Введение

Пропашные культуры, к которым относится и соя, в условиях Среднего Приамурья возделываются на профилированной поверхности – гребня 70 см и грядах 140 см. Наряду с водоотводными каналами, обеспечивающими сброс избыточной влаги в период муссонных дождей, основным технологическим агромелиоративным приёмом управления тепловым и водно-воздушным режимами в корнеобитаемом