

STUDY OF MARKET SUPPLY STATISTICS IN TRADING OF HOPSMartin PAVLOVIČ¹, Douglas MACKINNON² and Boštjan NAGLIČ³

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Abstract

The International Hop Growers' Convention (IHGC), is the only international body representing the interests of members of the hop industry from around the globe. Part of its duties within its Economic Committee are to report data from 21 hop producing countries three times each year. Data collection methods and methods unique to the U.S. and Germany are discussed. The U.S. and Germany produced 40.18 and 33.74 percent of the world's hop acreage respectively in 2020. The balance of global acreage (i.e. 26 percent of total global acreage) was divided by 19 producing countries. Reporting methods are demonstrated and data unique to the IHGC is highlighted. The qualitative value of the organization to the industry is also revealed.

Key words: hops, market analysis, supply parameters, prices, alpha-acids, IHGC

ŠTUDIJA TRŽNIH STATISTIK PONUDBE HMELJA**Izvleček**

Svetovna hmeljarska organizacija (IHGC) je edino mednarodno združenje, ki zastopa interese hmeljarjev in trgovcev s hmeljem z vsega sveta. V aktivnostih Ekonomske komisije analizira trikrat letno tržne statistike ponudbe hmelja iz 21 držav pridelovalk. V članku ilustriramo metodologijo analize ponudbe hmelja in izpostavimo statistike za ZDA in Nemčijo, ki sta 2020 obsegali 40,18 oz. 33,74 % svetovnih površin hmelja. Preostali delež svetovnih površin (tj. 26 %) je porazdeljen še na 19 držav proizvajalk. Predstavljena je metodologija zbiranja, analize in poročanja tržnih statistik v okviru IHGC in kvalitativni doprinos organizacije za svetovno hmeljarstvo.

Ključne besede: hmelj, analiza trga, parametri ponudbe, cene, alfa-kislina, IHGC

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1 INTRODUCTION

Hops (*Humulus lupulus* L), along with malt and water, are the basic raw materials used for beer production. The basic role of hops is to provide beer with a pleasantly bitter taste and a hoppy aroma (Štěrba et al., 2015). They will grow under most conditions in most countries as an ornamental. It is native to Europe, Asia and North America (Roy et al., 2001). Commercial production takes place in latitudes greater than 35 degrees in both the Northern and Southern Hemispheres due to strong photoperiodism requirements for flowering (Henning et al. 2015). The female hop plant produces cones in which resins and oils are found. The cones contain many lupulin glands, which are located on the adaxial surfaces of the cone bracts (Castro, 2008). Alpha-acids such as humulone, adhumulone and cohumulone and beta-acids such as lupulone, adlupulone and colupulone are found in the lupulin glands along with other prenylflavonoids and essential oils (Haunold, 1981). These compounds are important in the brewing industry (Matoušek et al., 2016).

There are only several areas where hops produce yields that make them a commercially viable product. Hops are international trading commodity in the agricultural market. Their potent bitterness and pungent flavor ensured the limited market for hops. Beer production remains the only market requiring hops in significant since breweries consume 98% of global hop production (Cooberg and Hintermeier, 2012). There are other products that use hops in very small quantities. Teas, pillows and other sleep aids made with hops exist as homeopathic remedies around the world in amount of around 2%. However, none of these products require enough hops to affect the supply produced in a meaningful way (MacKinnon and Pavlovič, 2020).

In 2021, there were globally 298 commercially grown hop varieties (IHGC, 2021a). Hops take a very small part (about 1%) in the structure of costs in brewing industry (Pavlovič, 2014). Used in the production of beer, they contribute greatly to the sensory profile of a beer. Aroma hops give off scents as varied as grass, grapefruit, chocolate, pepper, mint, apricot, and tangerine (Helphand, 2014). Craft brewers producing Indian Pale Ales (IPAs) worldwide sought these flavors during the double-digit growth of craft beer production between 2009 and 2015 (Watson, 2015).

In 2020 approximately 62,104 ha of hops were cultivated worldwide with a world crop of 123,025 metric tons of hops. Estimated production of alpha-acids, the most important significant shared attribute among all hop varieties, was 13.302 metric tons (IHGC, 2021b). The International Hop Growers' Convention i.e. IHGC tracks the world's commercial hop production data and provides an invaluable service to the industry. Valuable commentary on the global supply and demand situation is often provided by the German Hop Merchant Association (Deutscher Hopfenwirtschaftsverband e.V., also referred to as DHWV). For example, in its

November 2021 report to the body, the impact of the pandemic on global demand for hops and hop products was summarized (DHWV, 2021).

As of October 2022, there were 21 country members (hop producers' organizations) and 14 corporate members (hop trading companies) of the IHGC. The statistics the organization collects and disseminates to its members embrace data regarding production of hops, aggregating the world's variety structure and analyzing hop market trends. In November 2021, North American and European countries produced 89,78 percent of total IHGC-tracked production in 2020 and reportedly accounted for 91,78 percent in 2021. U.S. and German production alone were responsible for 76,74 percent in 2020 and an estimated 77,20 percent in 2021 (IHGC, 2021b).

2 MATERIAL AND METHODS

The International Hop Growers' Convention holds meetings three times each year, in April, July-August and November. The timing of these meetings is strategic to allow updates on planting activity in the spring, progress of the crop prior to harvest and a recap of yields and production in November. The data reported during Economic Committee meetings are collected by the chairman of the committee during the weeks leading up to the meeting with some members submitting their data only days prior to the event. Oftentimes, collecting such data necessitates more than one contact between the economic committee chairman and the reporting country delegate. These data consist of acreage, quantity of hops produced, an estimate for the quantity of alpha produced, hop variety structure, the volume of hops sold ahead each year by each member country and average prices (MacKinnon and Pavlovič, 2019). Some countries are reluctant to report. When this happens, it is acceptable to collect data regarding a hop producing country from third parties. In the past, members of the DHWV have provided country data regarding non-reporting countries unofficially during meetings.

IHGC member country delegates have been regularly encouraged to provide official hop supply statistics from their countries for decades prior to meetings of the Economic Committee emailing them to the IHGC Secretariat. All data on member country level were processed and prepared for the coming IHGC meetings. The collected hop supply statistics are a part of the IHGC archives (IHGC, 2022).

During IHGC meetings, representatives from each country present are encouraged to stand and give an oral report regarding the situation in their home country during the previous years. While these reports always cover the data submitted, they may also include other useful information explaining why the numbers are as reported and issues that growers dealt with during the previous season. Other members in

attendance are allowed and encouraged to ask questions for clarification, or for other information from the reporting country representative.

Since the largest hop producing countries, the U.S. and Germany, dominate the global market, this research focused on analyzing hop supply data from these two countries between 2007 and 2021. We collected and analyzed data regarding the following parameters: (i) hop acreage (ha), (ii) production of hops (t), production of alpha-acids (t), (iv) value of hops sold ahead (USD, EUR) and (v) SAP i.e. season average prices of hops (USD, EUR).

We sourced data from the IHGC Economic Committee November reports from the subsequent year (e.g. 2021) to represent data regarding the n-1 year (e.g. 2020). These data had the highest accuracy regarding the previous year's data and better estimates regarding the current year data than the spring or summer reports from the current year due to the existence of official data by that time. Current year reporting was often based on estimates from representatives of member countries as official government related sources were not yet available. As these estimates occurred following the harvest and members were acutely aware of the situation in their home countries, data needed only slight revision in subsequent years.

3 RESULTS AND DISCUSSION

Research results are focused on the three main hop market supply elements such as acreage of hops, production of hops and production of alpha-acids. In addition, season average prices and value of hops sold ahead are discussed.

The U.S. and Germany produced 40.18 and 33.74 percent of the world's hop acreage respectively in 2020. The balance of global acreage (i.e. 26 percent of total global acreage) was divided by 19 producing countries. Furthermore, the U.S. and German hop growers supplied 38.64 and 38.10 percent of hops while related to the production of alpha-acids, as the most important brewing quality parameter, even 41.35 and 40.88 percent (IHGC, 2021b).

Data reported by the IHGC regarding the U.S. (Figure 1) is very similar to that which is available from other sources in historical context sometimes only months after the fact. The timeliness of year-specific data and evidence of the formation of trends over time is valuable information. American representatives have long had the practice of estimating the situation on the ground in the U.S. at the moment the report is offered. These have been the numbers they have reported to the IHGC.

The reports by member countries to the IHGC are provided in the same format offering continuity in the method of data collection. This continuity in data collection over the decades offers a valuable service in that it may be compared year on year

with previous seasons to establish trends over longer periods. In their November report, data reported by American representatives to the IHGC is valuable as a recap of the situation during the year even though it may not represent statistics collected by the USDA NASS.

For the spring report, typically held in April, American reports provide a valuable estimate of acreage planted for harvest before such information is available elsewhere.

For the summer report, Americans seldom update their data regarding acreage as there often have been no significant changes since the spring report. Rather, the discussion in the summer pertains to recent weather events, as well as pests and other challenges. The anticipated effects of these and other events upon yield for the current year are offered to the group and lively discussion often occurs. As many of these details are non-quantifiable, they cannot be included in the summary report.



Figure 1: U.S. Hop Acreage, Hop Production and Alpha Acid Production 2007-2021.

German representatives regularly attend IHGC events and provide hop acreage, hop production and alpha-acid production data in a similar format (Figure 2). Contrary to the Americans, the German delegation only reports government approved figures, which are updated annually in their IHGC reports. The German November reports are updated with current year official data. German delegates do not speculate on the current situation in spring and summer official reports, reducing the value of IHGC reported data at those two meetings. They do not submit speculative data in writing

in an official capacity to the IHGC. Those in attendance, however, are quite helpful during meetings with regards to providing insight on the current situation in Germany and regularly do so in when asked by other members present.

There have been periods in the past when the extreme oversupply of hops and alpha-acid dominated discussions. This was more typical in the period when homogenous products were produced by all member countries with alpha-acid being the similar characteristic among all hop varieties. The most recent severe surplus began in the mid-1980s with the introduction of higher alpha yielding varieties without a corresponding reduction in the acreage planted. The supply situation remained largely unchanged until approximately 2004 when the earliest signs of a recovery began to emerge to those with access to the proper data. During these periods of extreme over supply, discussion among the group's members often centered around what could be done to remedy the situation. The November 2004 Economic Committee report although only a summary offers a rare glimpse into the concerns of the industry at that difficult time.

Most spot bitter hops have been consigned to pools both in Europe and in the US with no or only minimal pre-payments to growers. Based on the current market development one cannot count on any significant additional payments. It can only be hoped that this clear market signal will convince growers everywhere to reduce their bitter hop acreage in order to bring the bitter hop segment back into balance. For that purpose, Germany is offering an acreage idling and reduction program to its growers in order to reinforce the message and to alleviate the financial burden. Only a continuous reduction of acreage can maintain long-term prices above production costs as overall demand for hops continues to decline as a consequence of reduced hopping rates worldwide. A conversion of existing bitter hop acreage into aroma varieties would be very counter-productive.

The industry trend towards increased emphasis on the spot market continues unabated. Brewers are reluctant to enter into long-term contracts as market trends change and their brand portfolio adjusts. They are also afraid of losing out to their more reckless competitors who speculate on low spot market prices. It is also obvious that the trend towards further consolidation in the brewing industry will continue and that smaller, independent brewers will be taken over by the larger groups. This development is clearly not to the benefit of the hop industry as the big groups show no loyalty to growing regions and their bargaining power becomes ever stronger (IHGC, 2004).

As with any group containing such diverse membership, the difficult times of the 2007-08 hop shortage revealed a lack of unity regarding the vision of the industry between some of the group's members that appeared to stem largely from differing business philosophies. In the July 2008 market report, the DHWV published the

following statement. As a consequence of the behavior of the Eastern European growers and trading companies, virtually no forward contracts are likely to have been placed in their region. The historically favorable opportunity to obtain long-term security was sacrificed in these countries for the sake of short-term profit (DHWV, 2008).

Sixteen months later, the global market situation had changed. Once again, the industry was confronted with an extreme oversupply of hops. The DHWV, in turn, released the following assessment regarding the market. The surplus in crop 2009 amounting to at least 2,500 mts alpha-acids will contribute to a further increase in stocks. Within a very short time frame the world hop industry finds itself in a menacing oversupply crisis. Markets prove this. Breweries who have too many contracts try to roll their contracts into later years or to cancel them to control their stock situation (DHWV, 2010).

Whether the DHWV or the Eastern European growers were correct in their actions or not, is beyond the scope of this article. The IHGC provided a forum for these discussions to take place. It is the belief of the author that facilitating a free and open discussion between industry members, regardless of the issue or the outcome, is always a positive force for good.



Figure 2: German Hop Acreage, Hop Production and Alpha Acid Production 2007-2021.

A data point scarcely available elsewhere in the world hop industry is volume of the crop sold ahead. The IHGC provides estimates of this figure from its member

countries annually. In the case of the U.S., when this figure is combined with the U.S. season average price, a figure provided by the United States Department of Agriculture National Agricultural Statistical Service (USDA NASS) to the hop industry each December, an approximate value for the quantity of American hops sold ahead may be calculated. When this is applied to successive years, the trend in the value of the crop sold ahead becomes apparent (Figure 3).

The value of U.S. and German forward contracts were \$204 million (equivalent to 180 million Euros) and 300.1 million Euros in 2001 respectively. The value of German forward contracts grew significantly in the next two decades. As of 2020, German sold ahead contracts set record highs worth an estimated 1.33 billion Euros. The German season average price for 2021 was not yet available at the time of publication. U.S. forward contract value, however, soared to still higher heights and at a much quicker rate than the value of German hops sold ahead. From approximately \$200 million in 2001 the value of U.S. hops sold ahead soared to a record of \$2.7 billion in 2016 (the equivalent of 2.5 billion Euros at the time) after which they began to stabilize. The value of U.S. sold ahead contracts stabilized somewhat after 2016. Between 2016 and 2021, the value of the U.S. crop sold ahead stayed above two billion dollars registering its second highest value in recorded history in 2021 of an estimated \$2.49 billion (the equivalent of approximately 2.3 billion Euros in December 2021). Figures 4 and 5 display the total value of contracted hops for the U.S. and Germany during this time also increased.

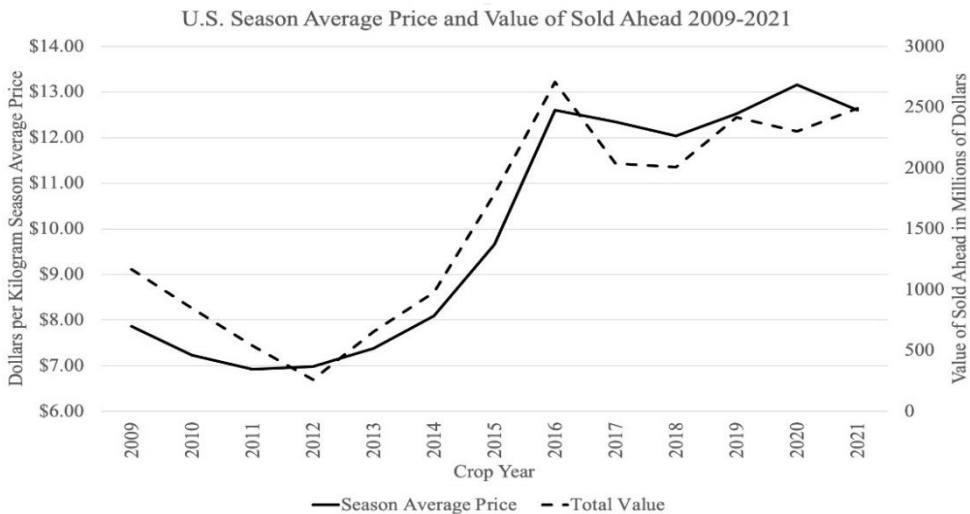


Figure 3: U.S. season average price and value of contracted hops as reported to IHGC. Source: IHGC Economic committee November reports 2009-2021.

When a similar procedure is applied to the German IHGC data, trends in the value of the German crop sold ahead are also visible (Figure 4). These figures represent a snapshot in time at which an approximation is made every year and contain some inherent limitations.

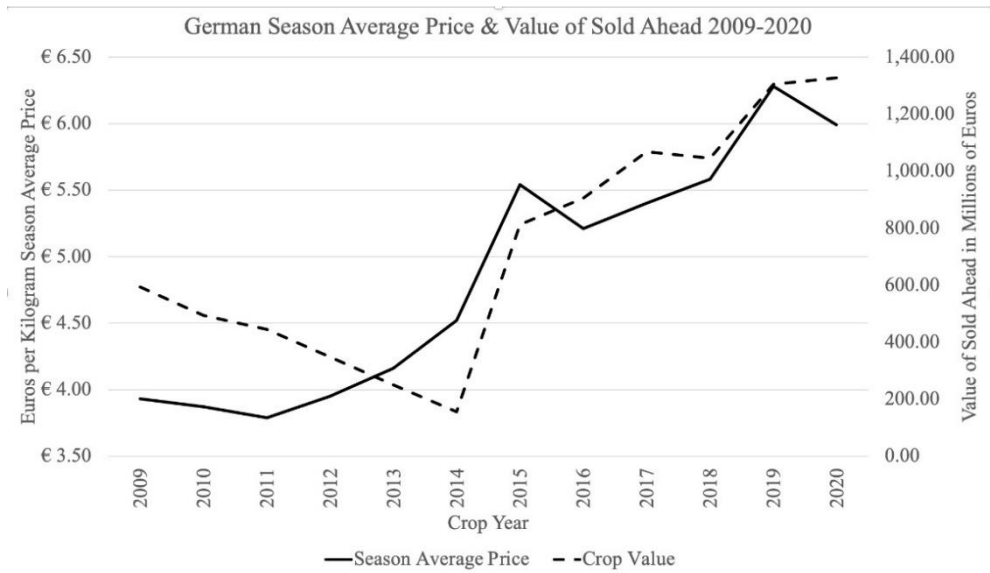


Figure 4: German season average price and value of contracted hops as reported to IHGC. Source: IHGC Economic committee November reports 2009-2021.

The sold ahead percentages for year $n+1$ through $n+5$ are based on year n production as future production cannot be known at the time of the report in year n . For example, if country X produced 100 metric tons of hops in year n and 95 metric tons of hops were sold ahead in year $n+1$ and $n+2$, those years would be reported sold at 95 percent. When year $n+1$ and $n+2$ arrive, production for country X may be 110 and 130 metric tons respectively.

During that time, however, the reported sold ahead figures are updated for year $n+1$ as it becomes the new year n . The same methods for using the sold ahead percentages for future years are again used.

4 CONCLUSIONS

The value of the IHGC to the hop industry is not only its collection of valuable production, acreage, yield and other hop related information from over 20 countries around the globe. The frequency of the meetings and this data collection makes it the

premiere organization in the hop industry where growers and merchants may come together to discuss industry specific events. The ability to report these data in a timely manner as events are unfolding provides exceptional value to its members as such data is often not available except to large multinational organizations. Data reported by the U.S. therefore reprints the best publicly-available real time information at the time of the report.

The value of the data may be questioned by some as some country reports represent only the best estimate of developments at the time of the report. The value of IHGC data is precisely in its representation of data at a snapshot in time. IHGC data for the current year should not be interpreted as specific data with 100 percent accuracy. Such data is only possible, when it is possible at all, only months after the fact. The value of IHGC as an organization as a whole as well as the data it reports is the timeliness of the information disseminated periodically throughout the year. Since over time as more accurate data becomes available the organization's reports are update, the value of IHGC data over time is in the trends that emerge. A non-quantifiable effect of the regularity of the meetings is the camaraderie and familiarity it fosters between members of this small industry.

Despite the great value the organization provides, during periods of extreme oversupply, which do not favor the hop industry, its limitations are revealed. The IHGC shares many of the same weaknesses from which the United Nations suffers. While its participation is active regular and encouraging, the individual members of the group do not all have the authority to return to their home countries and implement the reforms discussed during the meetings. Many are simply messengers whose only recourse is to return to their home country and share the information they gathered while attending the IHGC meetings. Those individuals in attendance who do enjoy such powers at home have often been reluctant to implement changes discussed at the meetings due to their awareness that other members cannot or will not act in a similar manner. As with the United Nations, this is not a reason to disband the IHGC. The benefits of the camaraderie and freedom to discuss the issues of the day, whatever they may be, far outweigh the costs and limitations of such an organization. In fact, the greater the understand by members of the IHGC about their cohorts and their situation in the global market creates a more cohesive industry. It increases awareness of members regarding the global market situation of the day providing information to which they may not otherwise have access so they may act and respond should they so choose. These actions may not stem directly from the organization itself as a result of a resolution or decree, but they are indirectly influenced by the contacts and understanding fostered by such regular meetings between peers.

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