

F. J. Bosworth & Sons, Spains Hall, Willingale, Ongar.

The late F.J.Bosworth started farming at Spains Hall in 1934. The farm now consists of 260 hectares of combinable crops with an additional 12 hectares of woodland. An adjoining 12 hectares of arable land has been rented since 1995. The pig enterprise has a 276 sow breeding herd with all progeny finished on site and sold to two Essex abattoirs. The business generates additional income from letting two properties and a shoot, receiving Feed in Tariff payments from Solar PV electricity generation, as well as income from contract combining for a near neighbour.

Simon and Stuart have succeeded their fathers Henry and Tony in managing the arable and pig operations respectively. The continued success of the business rests with the skills and long term commitment of our excellent farm staff, Paul Marchant (19 years arable employment) and Pig Stockmen Chris Collins (26 years employment), Alex Lake (20 years employment) and Dan Latimer (16 years employment).

The farm is a member of FramFarmers buying group and Fengrain for crop marketing. The business employs the services of Prime Agriculture Agronomy as well as NFU Risk Management Services for Health and Safety auditing. Arable cropping is quality assured under the Assured Combinable Crops Scheme. The pig unit is quality assured under the Red Tractor Pig Assurance Scheme.

2016 Varieties

Winter Barley	Feed grain and straw bedding for pig unit	Sequel & Volume (Hybrid)
1 st Winter Wheat	Feed grain for pig unit	Santiago
		Kielder
		Reflection
		Lili (Group 2)
2 nd Winter Wheat	Marketed through Fengrain	Solstice & Skyfall
Oilseed Rape	Grown on contract to Fengrain	V316 Holl
Peas	Grown on contract to H.A.M.	Sakura (Marrowfat)

Blackgrass Control

The policy is to plough everything immediately behind the combine and power harrow apart from after Peas to create a stale seedbed. Spray off with glyphosate just before drilling. Crystal applied at 4 l/ha + DFF 0.15 l/ha (+Lexus on winter barley fields) pre-emergence. This year Avadex was used on certain areas for the first time. Very little Atlantis has ever been used on the farm. For the past 3 years, we have hand rogued every wheat field walking every tramline at least twice (up to four times if necessary) as we are determined to keep blackgrass out. Roguing continues until the end of June.

Machinery

JD 6830, JD 6620 + front lift, JD 6330, Alanco Sprayranger, JCB 526-55 Loadall, Claas Tucano 430 Combine, Dowdeswell 5 furrow plough, Flexicoil 4m front furrow press, Maschio 4m power harrow, Weaving RS4000 4m drill, Farmhand 4m drill, 24ft Twose Rolls, Amazone 1501 variable rate spreader.

Case/Int. 995, Case 4230XL, JCB Fork Truck, Mitsubishi Fork Truck, Int. 684 and Int .475.

Crop Storage

There is storage for 2,500 tonnes of grain on the farm as well as extra capacity in a former 800 tonne insulated potato store and mill/mix wheat and barley storage bins. Rape and Peas are stored on wooden drying floors. All crops are dried, if necessary, through a Svegma 7 tonne per hour drier. Martin Lishman pedestals are used to ventilate stored grain, with all temperature monitoring and fan controls linked to office based Barn Owl computer software.

Slurry

Slurry is separated before liquid is stored in one of three above ground tanks with a combined total capacity of 4000 cubic metres (approximately 10 months storage). Slurry solids are stored with dung from some straw-based pig Housing in a covered manure store, which was erected in 2005 with financial support from a 40% Farm Waste Grant to encourage Nitrate Vulnerable Zone compliance.

Slurry is spread on cereals in the spring and on land destined for oilseed rape in the autumn by Tramspread contractors with umbilical pipe system. The aim is to maximise the availability of plant nutrients from slurry spreading, which is higher from spring application. A typical application rate of 42 cubic metres per hectare provides 47kg/ha available Nitrogen (£18/ha), 34kg/ha available Phosphate (£21/ha) and 118kg/ha available Potash (£49/ha). At current fertiliser prices, the available plant nutrients in pig slurry are worth approximately £2.10/cubic metre of slurry. In a dry spring, we have recorded yield advantages of 0.2 tonnes per hectare in wheat with equivalent total N applications, but where slurry had been applied in early spring.



Peas and Oilseed Rape

Peas are combination drilled using a 29 year old Farmhand drill mounted behind the Maschio power harrow, with a 4 metre furrow press on the front of the tractor. Oilseed Rape is drilled by D.R.Metson contractors using their Claydon drill. Oilseed Rape is direct combined, usually without desiccation, using header extension plates on the Tucano combine.



Yields

	2011	2012	2013	2014	2015	5 year average
Wheat 1 st	9.84	9.71	10.20	11.06	11.91	10.54 t/ha
Wheat 2 nd	9.79	8.60	8.19	11.81	10.18	9.71 t/ha
Wheat Total	9.83	9.32	9.44	11.39	11.20	10.24 t/ha
Barley	8.02	9.06	8.95	9.84	10.33	9.24 t/ha
Oilseed Rape	4.67	4.30	3.58	4.53	4.50	4.32 t/ha
Peas	5.09	3.35	4.04	4.05	4.24	4.15 t/ha

Recent Innovations

The business has invested in:

- Barn Owl computer monitoring and control for energy efficient stored crop ventilation.
- Topcon satellite guided steering system adaptable for use on cultivations, drilling, spraying and combining, for accurate and efficient field work.
- Soylsense variable rate N applications, using Leaf Area Index from satellite images of crop canopy variation throughout the growing season to optimise Nitrogen use.
- Ceres crop yield mapping of each field on the combine to monitor yield variation.
- Ground source heat pump, extracting heat from well water to under-floor heat a new build house, boosted by roof mounted solar heating.
- 2 x 50kW Solar PV ground mounted arrays on south-facing site close to farm buildings to generate electricity.
- Rescue Deck System for supplementary rearing of surplus piglets from large litters, supported by a £7,000 BPEX Innovation Grant to evaluate the system for the UK Pig industry.
- Schippers Greenline detergent/disinfectant metering device linked into pressure washers for accurate dosing and application, allowing efficient cleaning and disinfection of pig pens.
- Upgraded home mill/mix system, adapting and improving many original components of the old system to increase output and accuracy and reduce labour requirement.
- Stainless steel slurry stores and separator for Nitrate Vulnerable Zone compliance after pig unit expansion.

Solar PV

From 1st October 2011, electricity prices rose by 11% and 16% for night rate and 18% and 25% for day rate electricity supply to our two farm meters. This prompted an investment in Solar PV to help mitigate the risk of further energy price increases on the business, which is dependent on electricity throughout the year for milling and mixing pig feed and heating and ventilating pig buildings. Our total electricity cost to the business in the year ending 31/3/2012 was just over £16,000.

An obvious south facing field site adjacent to the farm buildings and within reasonable distance to connect into the two farm meters was chosen ahead of roof mounting panels, as the south facing roofed building was deemed to be in too fragile a condition for extra load-bearing from solar panels. Mosscliff were instructed to complete the installation before the deadline of 1st November 2012, to avoid reduction in Feed in Tariff payments from a guaranteed 13.5p/kW index linked for 20 years. The combined FIT income/electricity saving/electricity export equates to an annual return of 17% on capital expenditure, with annual electricity costs now in credit by £5,000.



The Pig Enterprise

The physical and financial performance of the pig unit is regularly monitored using Pigpro software (since 1990) and Sage farm accounts (since 1993). Records on all aspects of pig unit finance and performance are used to drive the business forward. Management is focused on influencing the key inputs of stockmanship, pig genetics, health, feed, housing and marketing to optimise profit. Attention to detail is essential in rearing pigs successfully. The breeding herd results place the pig unit consistently within the top 10% of UK herds.

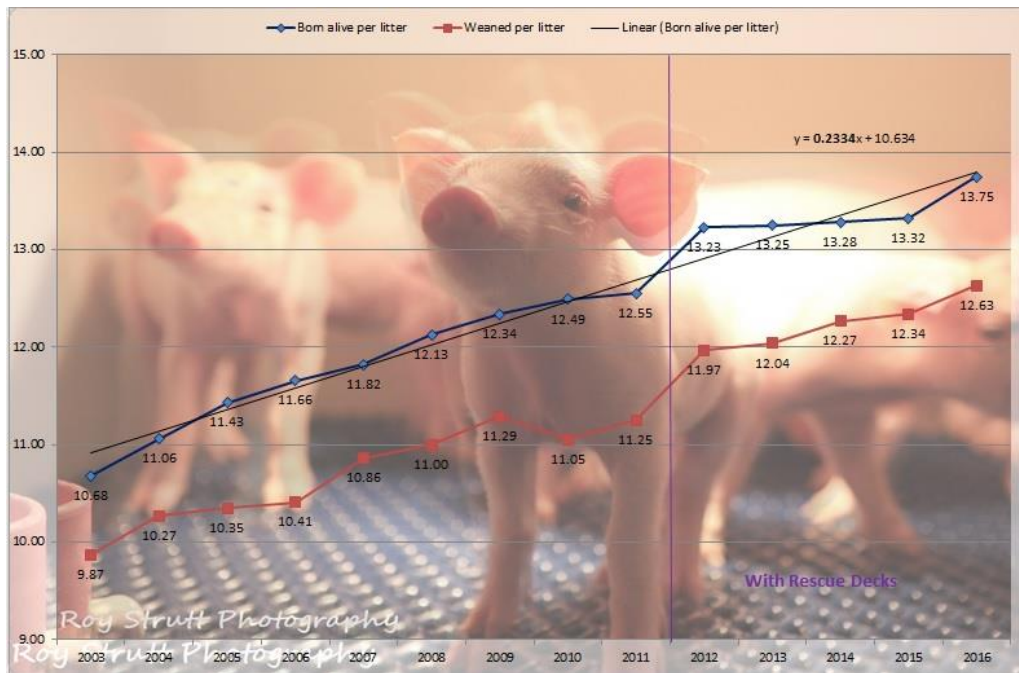
	12 months to May 16	12 months to May 15	12 months to May 14	12 months to May 13	12 months to May 12
Number of pigs sold	7879	8052	7739	7221	7123
Average no. of productive sows	276	276	282	281	272
Number sold/sow/year	29.04	29.60	28.03	26.43	26.74
Litters per sow per year	2.37	2.36	2.40	2.39	2.36
Born alive per litter	13.75	13.34	13.19	13.32	13.13
Reared per litter	12.67	12.31	12.23	12.06	11.89
% post-weaning deaths	2.74%	3.00%	2.99%	4.62%	3.47%
Daily growth rate (grams/day)	710g	677g	661g	664g	681g
Av. Sale weight (kg)	93.61kg	92.20kg	89.83kg	91.44kg	93.84kg
Feed Conversion Ratio	2.21	2.28	2.29	2.29	2.27
Sow feed/sow/year (tonnes)	1.39t	1.35t	1.36t	1.29 t	1.31 t

Stockmanship

Alex, Chris and Dan have been employed at Spains Hall from a young age and have received training and qualifications in pig production at Easton College in Norfolk in the early years of their employment on the farm. Chris has responsibility for managing gestating sows, gilt rearing, pregnancy scanning and mill and mixing feed. Alex concentrates his attention on the management of the farrowing section including the Rescue Deck system and combines with Dan on grower and finisher pig care. Dan is responsible for the management of the weaned pigs, ensuring they have a smooth transition onto solid feed after weaning at 4 weeks old and establishing efficient early growth rates. All three stockmen live away from the pig unit and receive a monthly production bonus based on a two month rolling average of the number of pigs sold per sow at the time of conception ten months ago. During quarterly Vet visits, all three staff has responsibility for showing the Vet around their own sections of the pig unit and discussing where further improvements might be made. They are also very capable at passing on their stockmanship skills to the numerous Vet students that gain work experience on the pig unit during the year.

Pig Genetics

There have been pigs at Spains Hall continuously since 1934. Grandfather Fred and Stuart's father Tony Bosworth established and improved the Laver Herd of pedigree Essex pigs up until 1959, selling breeding stock with a good reputation gained from successfully showing pigs around the agricultural shows. Fred and Tony Bosworth each won the Ashton Bowl for most points in a year gained from showing the Laver herd. Since the advent of large breeding companies in the late 1950's, the Spains Hall herd concentrated on commercial pig production based on the Large White and Landrace breeds. Stuart has built up the herd since 1983 and became the third generation of Bosworth's to win a nationally recognised award for pig-keeping in 2011. Since 1990, replacement gilts have been bred on farm and further developed by selecting damline genetics from PIC, Rattlerow and Hermitage breeding companies using artificial insemination. Since 2010, damline artificial insemination from Topigs, a Dutch breeding company with 80% of their own market, has been imported direct from a high health AI stud in the Netherlands and this has made further significant improvements to the now unique and highly productive Bosworth breeding sow. The following chart shows the progression in numbers born and weaned per litter and the mortality gap closing through the Rescue Deck investment in June 2011.



Pig Health

Following pig disease outbreaks such as Swine Fever in East Anglia, in 1990 the Spains Hall pig unit became a closed herd to incoming stock to reduce the risk of introducing disease. Our relatively isolated location in relation to other pig farms is an advantage to maintaining a healthy herd.

Up until 2012, with good biosecurity, our pigs remained free from the major immunosuppressive pig diseases such as PMWS, PDNS and PRRS that have afflicted the rest of the UK pig industry. On the evidence of consistently negative blood test results, we supplied some of our high health pigs to the Royal Veterinary College for UK pig industry disease research purposes at a significant premium price.

In April 2012, our herd eventually broke down with PMWS, a wasting disease in weaner and grower pigs. Pigs are now vaccinated against Porcine Circovirus and Enzootic Pneumonia and have returned to good health.

Internal herd health is controlled by weekly all in/all out batch production with routine cleaning and disinfection of buildings to break any cycle of disease build up on the farm.

Pig Feed

All pigs over 7 weeks of age are fed on home-mixed meal diets including wheat, barley, soya, middlings, rapeseed meal, soya hulls and a blend of salmon and sunflower oil. A pig nutritionist is used to make adjustments to the least cost formulated diets according to pig observations, performance data, ingredient availability and price.

Approximately 850 tonnes of wheat and 450 tonnes of barley are milled each year for the pigs. Extra new storage bins allow full lorry loads of soya and middlings to be delivered each time, reducing transport costs. Breeding gilts are fed a specialist diet ad-lib from 22 to 35 weeks to promote a good level of body reserves necessary for a long productive breeding life. Changing electrolyte balance with different sow mineral inclusions is used to allow sows to store Calcium in gestation, and then release Calcium for improved lactations and pig weaning weights at 4 weeks of age. In 2016 we started making and feeding a pre-lactation diet to further improve lactation sow performance .

Pig Housing

The pig unit has recently expanded by self-building more of our own design of finisher accommodation to ultimately take pigs to heavier slaughter weights. The extra space is currently being used to allow refurbishment of some 25 year old finisher buildings. Young pigs are housed in container buildings that are manufactured in Northern Ireland and craned onto site. These are well insulated, environmentally controlled and easy to clean for efficient production. This style of building attracts 100% Annual Investment Allowance as plant and machinery, not being fixed to the ground.

Many old farm buildings are still used to house pigs on a straw-based system. The long term aim is to house as many pigs as possible in slatted buildings and free up some of these older buildings for alternative uses, and plans have been prepared for a planning application for future expansion of the pig herd.

Pig Marketing

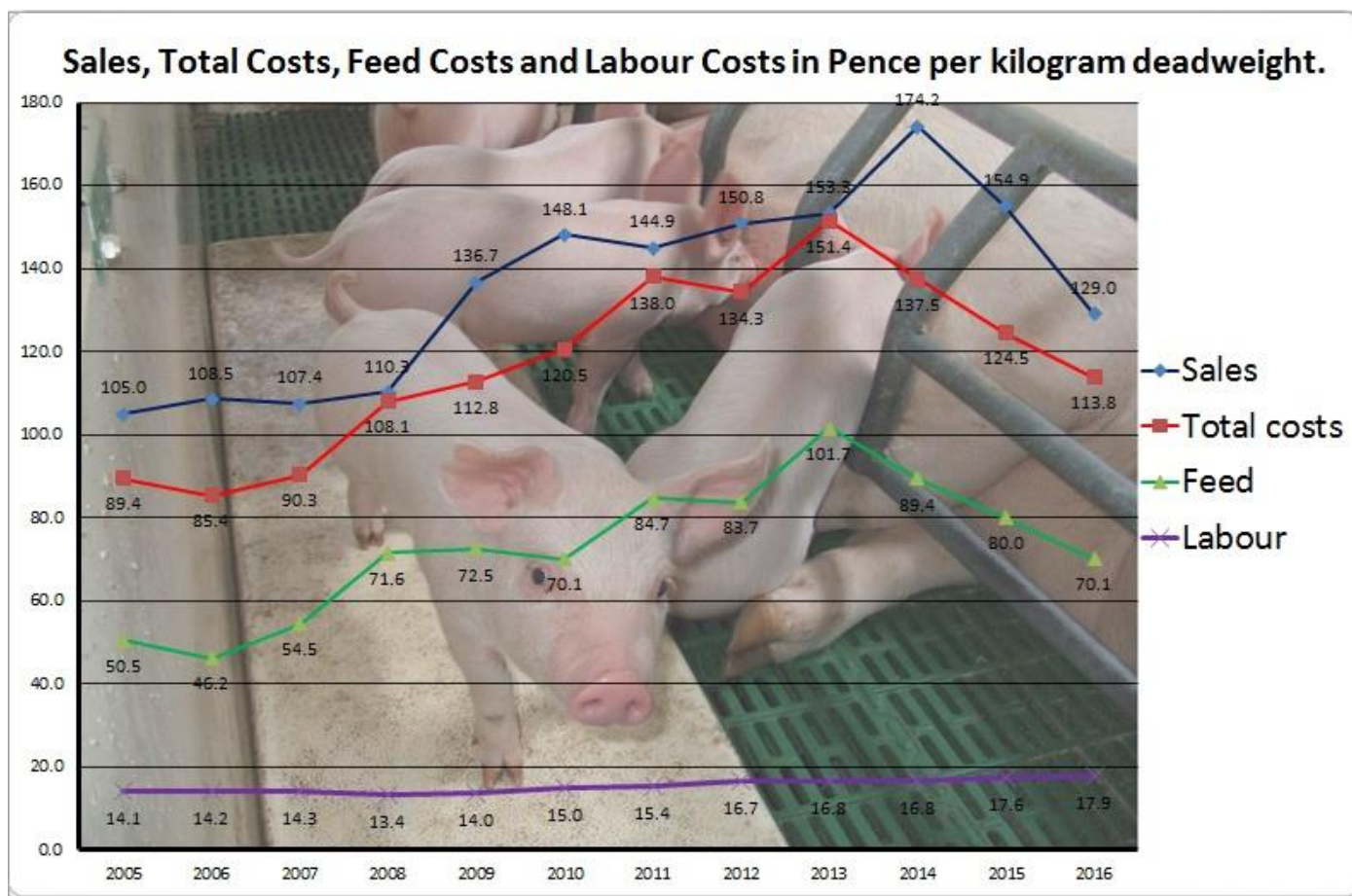
Fowlers at Burnham and Humphreys at Chelmsford are our two customers for finished pigs, while we run cull sows to Cheales at Brentwood every week. Finished pigs are marketed through two different marketing groups, Thames Valley Cambac and Meadow Quality Livestock. Both abattoirs supply local butchers and the catering trade. We have hosted a group visit for Seges Danish Pig Researchers in June 2016, following a regular annual visit by a group of Danish agricultural students. We also host pig educational visits for groups of students from Writtle College every year and provide work experience opportunities for numerous Vet students.

Stuart's son Jack has started working at Spains Hall. He runs an independent Hog Roast business using pigs born and reared at Spains Hall. Jack has also created a farm promotional video for the pig enterprise which won a £1,000 prize for innovation at the Pig Fair. In return for improved pig prices, we have recently allowed British Premium Meats, supplied our pork via Humphreys, to use this video on their website in future to demonstrate the provenance of their locally branded pork products.

Jack has also created a farm website as an aid to marketing our business. www.fjbosworth&sons@weebly.com.

Pig Financial Performance

Assuming good performance of stock, the profitability of pig farming is greatly influenced by the relationship between pig prices and feed costs. Both have been extremely volatile in recent years, so it is essential to keep monitoring the financial position of the pig enterprise using Sage accounts and Pigpro data. The following graph shows sales value, total costs and feed costs in pence per kilogram deadweight for the last 12 financial years.



The chart shows that after poor financial returns in 2008, 2011, 2013 and 2016, there followed a brief period of prosperity and there are early signs that 2017 could be a prosperous year for keeping pigs.

We hope that you have found this information to be interesting and that you enjoyed visiting the farm at Spains Hall, Willingale on Monday 4th July 2016.