Pork Journal

March/April 2013
Volume 35, Number 2

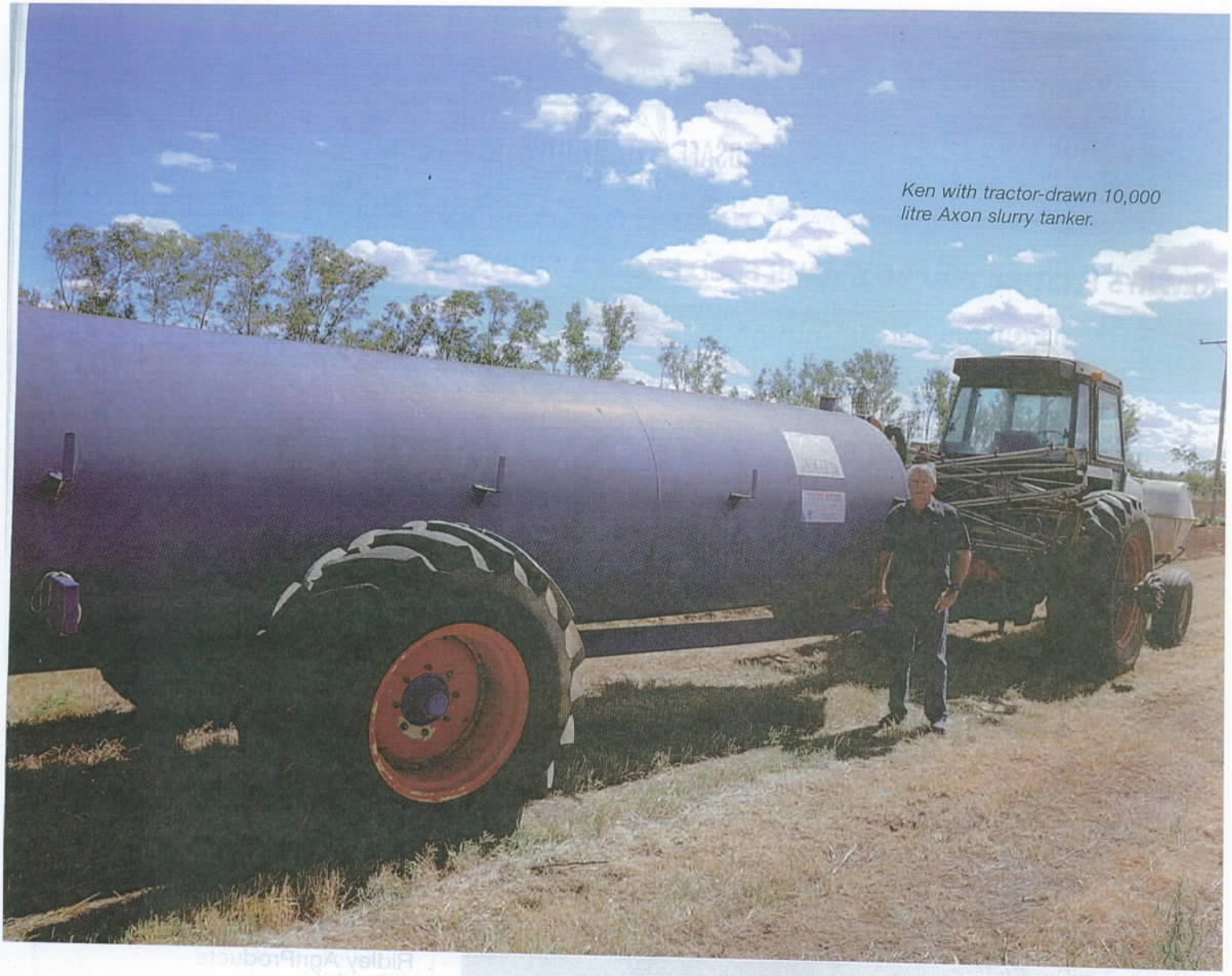
Man with a mission: Ken Crawford, pig farmer, ecologist and environmental research scientist

VIV Asia continues to grow in size and scope

Great turn-out for Bendigo Pig Fair

Alltech's 2013 International Symposium: Glimpse 2020

PrintPost Approved PP243095/00402 ISSN 1033-2758



Ken with tractor-drawn 10,000 litre Axon slurry tanker.

Man with a mission: Ken Crawford, pig farmer, ecologist and environmental research scientist

By PETER BEDWELL

Ken and Sue Crawford have owned and run Gowrie EcoFarm near Boggabri NSW for more than 37 years.

Ken has always had an interest in ecological agriculture and whole farm sustainability.

"Holistic planning and integrating pest management with nutrient management has enabled the soil building process to continue year after year," he said.

"At the same time, optimal yields have been achieved rewarding our family with a good standard of living.

"Piggery effluent treated by formulating pig rations with dietary natural zeolite has, together with other management techniques, transformed our property from a single enterprise farm into an integrated, diversified and highly productive operation.

"Safe storage and spreading of treated effluent, in a timely manner, has resulted in a connected ecosystem of soil, plant and animal relationships," Ken explained.

"I have accumulated more than a decade of experience in recycling waste nutrients using dietary clinoptilolite (a ▷

volcanic form of natural zeolite).

"A love of the land is an integral part of my identity forming who I am and what I do and I have conducted and reported on my research with the hope of inspiring others to reconnect with the land and enjoy the fulfillment that comes from working and living on it," he said.

The easiest way to understand the significance of Ken's work and experience in recycling waste using zeolite is to quote from a paper he prepared in January 2009 (Recycling waste nutrients in piggery effluent using dietary natural zeolite) as part of his research that resulted in him being awarded a Master of Sustainable Agriculture from Sydney University.

"Over half the nutrients fed to pigs are excreted. This is a problem for the pork industry in Australia and overseas as the excretions can have serious environmental impacts with N, P, K and Zn being of greatest concern," the paper's introduction reads.

"There is opportunity to recycle excreted waste nutrients by using dietary natural zeolite to effectively treat piggery effluent, enabling safe storage and slurry spreading as fertiliser.

"Applications of natural zeolite vary from handling radio active waste to horticulture and agriculture. This dissertation examines the use of dietary clinoptilolite (a type of natural zeolite) in piggery effluent management to enhance its fertiliser value.

"There are many nutrient loss pathways in storing and spreading piggery effluent slurry.

"The author views lost nutrients as a loss in fertiliser value and a lost opportunity to make use of this valuable organic fertiliser.

"Understanding and using dietary clinoptilolite technology aids in maximising fertiliser value and minimising environmental impacts.

"The technology may be considered part of a process known as environmental nutrition, which includes the reduction of waste nutrients through dietary means.

"This dissertation develops such an understanding using an extensive literature review and case study to explore where, how and why nutrient losses occur.

"It then explores the value of dietary clinoptilolite in piggery effluent management.

"The research shows that formulating pig rations with dietary clinoptilolite powder (particle size ≤ 76 µm to 5µm) is a safe, convenient and effective way of recycling nutrients from piggery effluent and reducing N losses, in particular.

"Gowrie Ecofarm is a practical demonstration of this technology.

"Experience and trial work under veterinary supervision has led to the following maximum inclusion rates by weight for powdered clinoptilolite in pig diet formulations: weaners 5%, growers 2.5% and breeders 1%.

Top: Target yield for soybean crop is 3t/ha. Above: Red Roc Booster made from dietary clinoptilolite, a volcanic form of natural Zeolite.

"In summary, this study shows that there is potential for widespread adoption of dietary clinoptilolite technology in the Australian pork industry, especially as fertiliser prices are increasing rapidly, land is usually available on pig farms for slurry spreading and soils are often infertile and require building up in terms of chemical, physical and biological fertility," the introduction concludes.

Interest in Ken's work with Zeolite has spread beyond the pig industry and in early 2010 the Australian Organic Producer ran an extensive report on his research conducted at Gowrie when the farm was running 60 sows producing around 1500 pigs a year.

"By adding dietary Zeolite into feed we recorded an improvement in daily weight gain of up to 16% for weaner pigs, improved back fat ratios which suggests better digestion of protein in the diets and less nitrogen excreted," Ken stated in that report.

On the subject of crop yields using treated manure, Ken explains that he applies a precise methodology to spreading the effluent using a tractor drawn 10,000 litre tanker which distributes four loads an hour spread over 10 metre strips of land.

"The effluent is spread evenly to a depth of around 2mm and is assisted by the anti-caking properties of zeolite, and the process is managed by an on-board computer connected to a ground speed sensor unit," he explained.

"The aim is to place small amounts in the right place rather than large amounts in the wrong place."

The crops grown on the farm are milled on site and integrated into pig diets and the yields reported by Ken demonstrate the effectiveness of his strategies.

"Our target yield for wheat are 7.5 tonnes per hectare and 3t/ha for soybeans: our best crop of wheat grown on a experimental block using only the treated pig manure as fertiliser was 8.5 t/ha," he said.

The zeolite product used by Ken is marketed under the name of Red Roc Booster, a zeolite powder created by him using raw material sourced from Castle mountain Zeolites mined near Quirindi in NSW and this company has now acquired the 'Red Rock' trade mark.

"The powder is effective as a livestock feed additive because of its particle size and it has been well researched and trialed," Ken said.

"High levels of untreated excretion is a cause for concern for a number of livestock industries, including pig production, globally as untreated effluent can lead to serious environmental impacts through leaching of concentrated minerals including nitrogen, phosphorous and potassium.

"A solution is to block nutrient loss pathways by treatment with Zeolite," Ken suggested.

"Typically in untreated effluent a major proportion of N volatises to NH3 (ammonia gas) and escapes into the atmosphere.

"What remains in slurry ponds can turn into soluble nitrate, a substance that can create serious environmental damage.

"The key to solving the problem of nutrient loss is to adopt a whole of farm strategy that begins with nutrient management," he said.

"Trials in Canada using Zeolite as a feed additive resulted in manure excretions with 15% less N and 22% less P when compared to untreated excretions.

"Also treating slurry with zeolite reduces N loss until it is ready to be absorbed by crops."

In trials conducted at Gowrie, adding Zeolite to feed significantly reduced nutrient loss while increasing fertiliser value.

"Reducing NH3 also reduces odour, a benefit for neighbours, livestock and those who manage them," Ken pointed out.

So much for the virtuous aspects of Ken's Zeolite based initiatives – what about financial benefit?

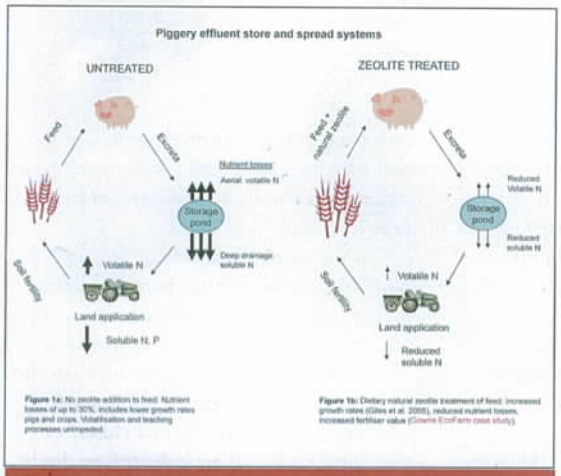
Ken estimates that for every 100 sows the value of nutrients excreted on an annual basis, and the potential of saving those nutrients as fertiliser could be as high as $32000 which includes about $14000 of N.

Ken's research has extended well beyond use of Zeolite and effective waste recycling.

In its Autumn 2012 issue *Irrigation Australia* published an article by Ken entitled 'Key area connectivity mapping – A better way of measuring groundwater'. In this article Ken describes a new way of looking at how surface water and ground water interact, and how this information could be used by water policy makers and planners.

In September 2011 Ken delivered a paper 'A new approach to surface/ground

Top: Slurry tanker delivers 4 loads an hour over 10 metre wide strips. Centre: 16% weight gain in weaners using 5% dietary Zeolite. Above: Zeolite treatment of slurry blocks critical nutrient loss pathways.



Above: The 'Virtuous' cycle.

water – connectivity mapping' at the NSW International Association of Hydrologists Symposium in Sydney.

Ken Crawford has made a major contribution to sustainable agriculture in Australia that goes well beyond the pig industry. The energy and focus he brings to his research is phenomenal and in recognition of his efforts he has been nominated for the prestigious Eureka prize for Sustainable Agriculture in 2013.

Judging criteria for the award are, 'The originality of the research, development and applications: the scientific rigour of the research or application, and finally the demonstrated impact of the research, development or application'.

Pork Journal has covered many stories on innovative pig farmers and their efforts but Ken and Sue Crawford's story would be up there with the best.

At a time when livestock industries, including pig farming, are coming under sustained pressure from animal welfare groups and others who use environmental arguments to critisise intensive livestock rearing, Ken has demonstrated that we can sustainably provide food for growing populations with existing resources if we manage them intelligently.

It is fair to argue that he may have achieved more in a decade than many could in a lifetime – we hope his efforts are recognised.

The full version of Ken's paper 'Recycling waste nutrients in piggery effluent using dietary natural zeolites' can be downloaded at www.cmzeolites.com.au ($37.00).

Finally after a long career as pig farmers and latterly scientific researchers, Ken and Sue Crawford are planning a well deserved retirement and time to head off with their 4WD and caravan.

The Gowrie Ecofarm – now with the pig sheds depopulated, is up for sale. Centered around a comfortable modern and well appointed five bedroom home on 68 acres and plentiful water supply, the Crawford family farm offers an opportunity for another innovative farmer to enjoy and prosper while sustainably farming and rearing livestock.

Go to www.realestate.com.au/property-lifestyle-nsw-boggabri-7471583