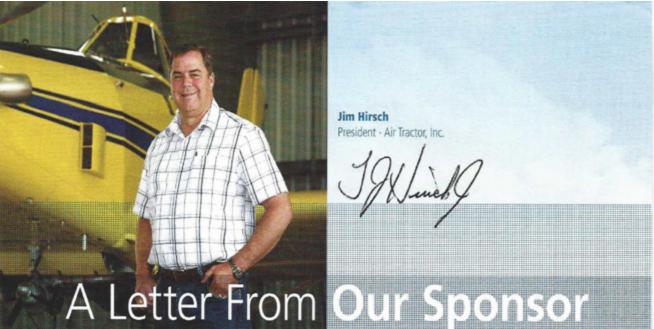


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OR decades aerial application has been a staple in many parts of the U.S., from forests in the West to pastures in the Plains to rice fields in the South. On limited occasions aerial operators have been called to the Midwest as to serve as "emergency services," extinguishing unexpected insect outbreaks such as spider mites.

But a number of factors have fostered explosive growth in the aerial segment these past few years. The advent of new corn fungicides designed to be applied at tassel has taken aerial work to a new level, particularly in the Midwest. Plus, advances in flight technology that allow for applications have made aerial a valuable addition to — and in some cases alternative to - ground approaches.

In fact, fans such as Craig Bair, aerial manager at Wilbur-Ellis Co., could list several advantages of aerial, including the ability to treat more acres per day than ground rigs; the ability to make extensive applications in busy, narrow treatment windows, especially if weather/soil conditions

are unfavorable; the absence of crop damage; and the lack

Specific to corn, Bair says: Research has shown that fungicide applications made to corn at the VT stage by air are more effective because the product is distributed to the upper half of the plant where it's needed for better ear development.

of soil compaction.

CropLife® reported on the corn phenom four years ago, as retailers scrambled to secure pilots to treat corn with the new strobilurin fungicides. This market has only grown since then. The products provide strong protection against disease, but they also have proved to generate a "plant health" benefit that give yields a decided bump.

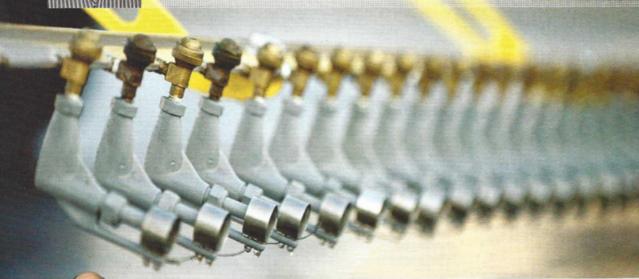
That boost has now been widely documented, though

exact figures may vary by region and disease pressure. Dr. Scott Bretthauer, pesticide safety Extension specialist with the University of Illinois, conducted a study that recorded a yield increase of 18.6 bushels per acre with an aerial application of fungicides. BASF's latest product HeadlineAMP, for instance, is showing average increases of 12.8 bushels, reports Dr. Gary Fellows, the company's tech service fungicide and seed treatment. Ag retailer Mike Carrell at Ceres LLP, Wingate, IN, has customers adding 7 to 10 bushels per acre. Bottom line: Growers have increasingly become believers in these products and are requesting aerial service, often through their retailers.

Advances in aircraft have also fueled aerial application popularity. "For all intents and purposes, planes are twice as big as they were," says Tony Goede, aerial manager with BASF. The most common planes in use today are powered by a turbine engine, cut huge swaths across fields, and carry 400 to 500 gallons of product. In fact, Air Tractor Inc. has a 1,000-gallon plane in development that, though targeted for firefighting, may be popular with its aerial application customers who currently own the company's 800-gallon aircraft.

The move to these larger turbine planes has not only added power for longer hours and bigger jobs, the craft





"These are million-dollar airplanes with some of the most advanced technology and avionics

and navigation equipment I've ever seen."

Dr. Gary Fellows BASF Corp.

have proven to be more reliable and need less maintenance than the previously used piston planes, says Jim Hirsch, president of Air Tractor.

"By moving into one or two larger aircraft instead of several smaller ones, operators are able to become more efficient and reduce overhead," says Hirsch. Some pilots we talked with still use the smaller Cessna-type planes that have capacities of 160 gallons. They're still plenty effective, particularly for manuevering in smaller fields.

In addition to turbine technology, planes now offer more

and flow controls. These upgrades make for more accurate applications, but the new flow controls in particular mean that pilots don't need to work as hard in the airplane to keep their speed constant across the field, says Steve Benoit, owner of Benoit Aerial Spraying, Kankakee, IL.

As in ground work, GPS has been a great boon for aerial application, with 99% of pilots now using it for navigation, according to National Agricultural Aviation Association's (NAAA) 2012 survey.

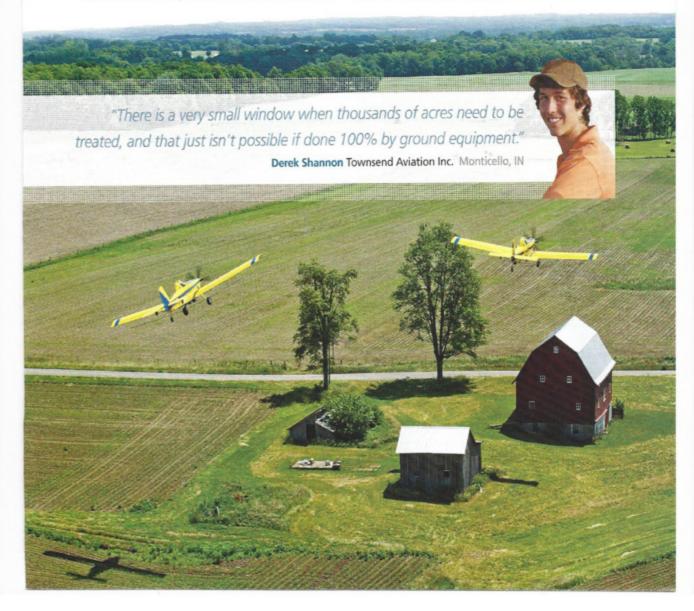
The past few years have also brought a host of advances in mapping software, the most notable being the ability to tie orders to georeferenced fields. Operators can create job maps in their offices more easily, then download them onto memory sticks for pilots to load in the computer in the cockpit. Benoit appreciates the ability to now receive these application jobs via e-mail — jobs that fertilizer dealers he partners with have booked with growers.

One powerful new resource is AgSync, a Web-based Internet hub that many Midwest retailers and aerial firms

advanced boom construction and placement, nozzle design now use for order management. After securing a job order the company transmits it, connecting GPS systems on planes with computers at the office; on the backside of an application, the system creates as-applied maps. BASF's Goede reports that more than 600 retail locations are utilizing the service, with over 40 aerial applicators linked in.

Experts we spoke with see a continuing bright future for aerial in part because this is a good time for agriculture products globally. Andrew Moore, executive director of NAAA, points out that growing populations and middle classes are demanding meat daily, with the accompanying demand for corn. He says growers are more likely to use yield aids such as corn fungicides, applied by air, when commodity prices are up.

In addition, chemical manufacturers are developing ways to keep the aerial market intact and the growth consistent, says Goede. They continue to come out with new fungicides and more product labels that include aerial directions. Plus, new herbicides are coming available for aerial application, particularly in Western states. .





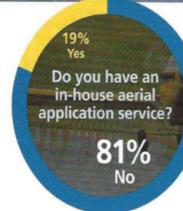
To understand how aerial application is viewed by the marketplace, *CropLife** conducted a survey of its readers, which produced some interesting results.

HIS summer, CropLife® editors sent out a brief survey to our enewsletter readers to better understand the impact aerial application is having on ag retailers, especially in light of this market's substantial growth in the last five years. While not all 126 respondents answered all 10 questions, they still provided solid information for us to work with. We thank the owners and managers who took the time to share their input. We received almost equal responses between cooperatives and independent dealerships, with a number of returns coming from firms that are a part of a national or regional chain of retailers (not coops).

The responses only highlight the importance of aerial work, with fully 88% of companies saying they used the services of an aerial application professional in the last two years.

What were the operators' assignments? Fungicides application. Preventive fungicide application on corn was No. 1 with 77% of the retailers saying they did this work for customers. Fifty-four percent made preventive fungicide application on soybeans.

But just over half (52%) came in with rescue applications of insecticides on corn and/or soybeans, proving this is still a vital need, even with the widespread use of genetically engineered crops.



Apart from the buzz about fungicides, aerial is also important in herbicide application as well, with 45% of dealers saying they used it on a variety of crops. Then, too, ag airplanes put down a considerable amount of fertilizer — 41% of companies told us they did this service for growers, a good portion perhaps going on rice fields in the South.

In our discussions with aerial experts and pilots for this report, one thing that frustrated operators was how retailers and growers don't plan well enough for applications. Tony Goede, aerial manager at BASF Corp., estimates a whopping 70% of work is "last minute," scheduled within a week or two of the need. Retailers in our survey (82%) said they do plan as much as possible but rely on rescue applications as well. Almost 10% admitted they "rarely" plan aerial work and count more on rescues. In fact, 8% said they only use aerial services for rescue applications.

Survey respondents had strikingly positive words about the quality of service they've received from aerial professionals. An impressive 84% say they felt the work was

For which services have you employed an aerial application professional

| Preventive fungicide application on corn | 77% |
|---|-----|
| Preventive fungicide application on soybeans | 54% |
| Rescue Application of insecticide on soybeans and/or corn | 52% |
| Application of herbicide, any crop | 45% |
| Application of fertilizer, any crop | 40% |
| Other aerial application | 19% |

"very good" or "exceptional." The applications were deemed "acceptable" by 12%, and "fair" by 4%. It is a testament to aerial professionals that none of the retailers surveyed rated their work "not acceptable."

Power Of The Planes

While ag aircraft have been evolving into powerful, cutting-edge machines over the past several years, the majority of our surveyed retailers did not seem too concerned about what kind of planes aerial applicators use. When asked if the aircraft type used influences the decision to work with an aerial company, 74% said no. The plane utilized was a deciding factor for 26% of retailers.

Many of today's operators are flying Air Tractor and Thrush aircraft with turbine engines that can cover large stretches of fields quickly — an imperative as treated acreage continues to grow. But smaller, out-of-production planes continue to service the industry as well.

A portion of our aerial report this month focuses on whether retailers should contract with an aerial firm or purchase their own planes. Of those we surveyed, 81% do not have an in-house aerial application service, while 19% do.

Our report shows the commitment to building your own aerial segment is absolutely huge. Our surveyed retailers understand that: 61% of them saying they have "no plans" to even consider the move. Four percent did consider the possibility, but decided not to move ahead.

But, alas, the business and scheduling control promised by having your own planes is enticing. Just over 3% of retailers responding said they are seriously considering the investment; 17% have discussed the possibility, and 15% said they have not considered an in-house aerial segment yet, but "may in the future."

Speaking Out

We posed one open-ended question to our surveyed readers: "In a few words, what is the biggest challenge you deal with in working with an aerial application profession-

How much of your use of aerial application is planned vs. rescue?

82%

10%

8%

We plan as much as possible but also use for rescue applications We rely on aerial services primarily for rescue application We only use aerial services for rescue applications

al?" The number one response was timeliness, followed by reliability/dependability, then by accuracy. Retailers obviously want the job done promptly by committed, trained applicators. We will see in this report how pinpointing grower customers' needs as much as possible in the fall and winter would be a real help in getting work done on time.

The next most important traits our respondents look for in pilots are professionalism and honesty. The pilots we talked with are committed to both. For survey respondents, professionalism is evidenced in part by being "clean and neat (that way I know he cares)" and "not a showman" or not "crazy." Retailers also valued a partnering relationship with aerial applicators that are "transparent, easy to do business with," and offer "good communication." As we will see, building relationships via regular and honest communication goes far in getting jobs done right.

Perhaps surprisingly, experience and equipment were not widely mentioned as challenges for respondents — though accuracy could certainly be a sign of experience. It seems retailers trust the skills and planes most of today's pilots possess, but the aerial operators we interviewed highly encouraged retailers to do research on both. •

Higher yields, more profit per acre.

Aerial application provides rapid, economical coverage of large areas and can apply crop protection when ground rigs can't operate. Tests show aerial application not only pays for itself, but can actually improve per-acre yield. In fact, many farmers have found aerial application makes dollars and sense as their primary application method all season long. And among aerial applicators, Air Tractor operators lead their industry with best practices for accurate, effective crop treatment.

Successful retailers know how aerial application plays an important role in protecting profits and delivering more yield on the field. Make it a part of your pre-season planning.



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S resistance to valuable crop protection tools continues to emerge, industry stakeholders are rallying to find ways to combat the problem.

Aerial applicators can indeed lend a hand.

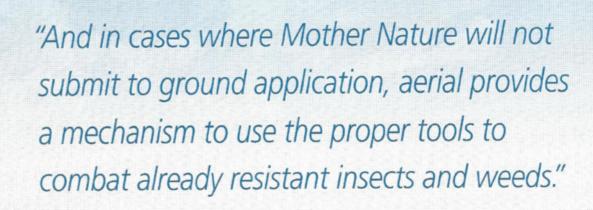
Our crop protection company and Extension contacts said growers should start with a systems approach that includes crop rotation, tillage, variety choice, varied modes of action, local risk evaluation and the like — then understand what aerial can bring to the table. What it can deliver primarily, they say, is prompt, accurate, and efficient control of pests that greatly reduces the development of resistance. If you kill the pest, it can't become resistant.

Just the physics of aerial application favor a complete kill because products very effectively reach intended targets, says Dr. Gary Fellows, tech service, fungicide, and seed treatment manager with BASF Corp. He explains that aerial applicators get a very good mixing of spray within the canopy because of the air buffer created under the wing. Turbulence there forces spray downward. In fact, Fellows says BASF has done coverage trials that show "very, very good coverage down deep" even into a tight canopy such as in narrow row soybeans.

Timeliness of application is another benefit aerial brings. Growers want to hit pests at the right development stage, for instance, when weeds are short and easier to control instead of when they're large. With planes, applicators can go in fields any time, especially when pests are vulnerable, says Dr. Scott Bretthauer, pesticide safety Extension specialist with the University of Illinois. They don't have to wait for soil to dry, as in cases where wet conditions may prohibit a ground rig.

"And in cases where Mother Nature will not submit to ground application, aerial provides a mechanism to use the proper tools to combat already resistant insects and weeds," notes Jim Loar, senior vice president of sales and marketing at Wilbur-Ellis Co.

Like ground operators, aerial applicators are now tuned in to precision ag techniques to enhance pest control, says Andrew Moore, executive director of the National Agricultural Aviation Association (NAAA). He notes that grower data (soil testing, crop scouting, and yield monitoring) is combined with GPS, satellite and aerial imagery, and variable rate technology to achieve effective pesticide applications. In fact, according to NAAA's survey, 21% of its members are using VRT.



Simple wise stewardship of products is vital. Mike Carrell, branch manager at Ceres LLP, Wingate, IN, says his
company makes it a policy not "to just blanket apply" corn
fungicides on every acre. His aerial contractors treat fields
that have the potential or already have the fungus present
— those planted to corn-after-corn or that have a history
of disease in the past.

Resistance And Drift

Bretthauer has found that some in the agricultural community "have a deathly fear" of aerial application due to a great concern about increased drift risk. Part of the issue here is that drift can cause unintended lower rates of product that won't completely kill pests, again, encouraging resistance.

"Reality is drift is primarily a function of droplet size, wind speed, and wind direction," Bretthauer says. "We can set aircraft to have just as large of droplets as with a ground rig." And he explains that in order to prevent drift, airplanes often don't spray a whole field at once — they spray it in sections based on wind direction, returning at different times during the day to cover sites completely, traveling 150 to 160 mph. Ground rigs often don't have the time to take this approach.

Then, too, smokers are a tool unique to aerial to help gauge danger from drift. Paraffin wax is simply released onto the plane's exhaust manifold and burns off to create white streams that clearly indicate wind direction, speed, and vertical mixing.

There is a tremendous need for the retailer/aerial applicator/agronomist to play a role as a trusted advisor to growers in resistance management, concludes Wilbur-Ellis' Loar. Education and communication among the stakeholders will be essential. •



Decision Time: Buy The Planes or



ETAILERS can meet grower demand for aerial application in a number of ways. Several *CropLife* applications are maintain them planes — in some cases purchasing entire aerial businesses — and to navigate the complexities that come with this service. Other retailers contract with local independent operators to meet their growers' needs.

Doing It Yourself

Let's start with the plane. Some of the latest turbine aircraft with capacities of 500 gallons can cost more than \$1 million. Then there are the expenses associated with maintaining the aircraft. Unscheduled engine overhauls, for instance, can cost as much as \$300,000 depending on the complexity of the job, says Craig Bair, aerial manager at Wilbur-Ellis Co. And don't forget the hangar space needed for the plane.

Also consider staffing — you need a qualified pilot and a skilled mechanic nearby, as well as a trained ground crew. Pilots want to take a job with an operator that has a proven track record of being able to keep an aircraft and operator busy, says Bair. If there is not enough work for him in a trade area, a dealer will have to cultivate work elsewhere.

Pilots need to meet the requirements of state and local authorities to be cleared to conduct aerial application from the local airport. Then, too, there are

state and federal licenses to get in time to do aerial applications and the ongoing training needed to maintain them.

As for mechanical expertise? "There are not many aircraft mechanics familiar with the specialized equipment installed on the modern spray plane," Bair warns

Service expenses extend from personnel to a product and fuel delivery infrastructure and operating costs as well. And more funds are needed for liability insurance and safety measures.

One final financial aspect: consider proper depreciation lives for airframes and engines, says Loren Koeman, regional business analyst with Wilbur-Ellis Co. "Tax depreciation often does not match up well with actual lives of components."

When Contracting Works

In light of the demands of owning and operating planes, most industry members we talked with thought contracting with an aerial business is the best way to provide air application, especially in the Midwest where the time frame for using the pricey equipment is so short.

"In the past we have talked with and done business with retailers that have tried both owning and contracting. In my personal opinion using a local aerial applicator is the best choice," says Derek Shannon, Townsend Aviation, Monticello, IN. He says these

Partner With Pilots



"Aerial application is definitely one way to differentiate a business from other retailers."

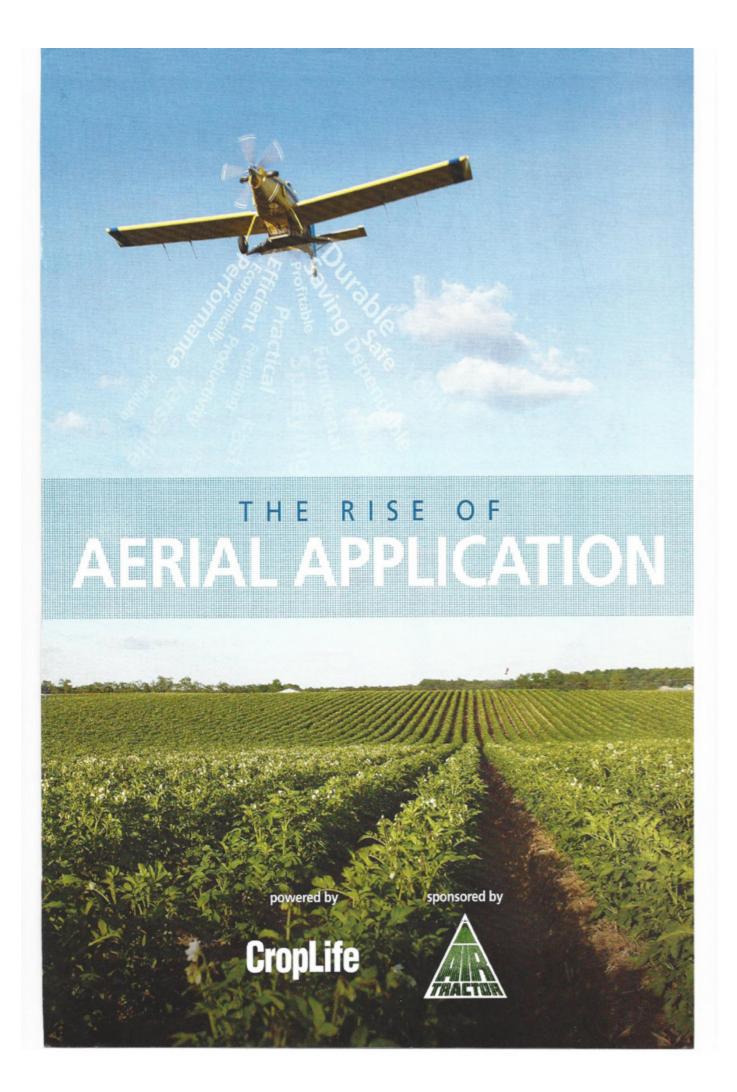
pilots are usually experienced veterans.

Having control of the timing of applications for customers is one of the biggest concerns a retailer might have about contracting, but planning ahead is a great help. Mike Carrell, branch manager with Ceres LLP, Wingate, IN, says at winter meetings with customers, his company will often offer a prepay discount on fungicides. Customers will buy and request an aerial application, then Carrell can go to his aerial applicator to at least offer an initial idea of the number of acres to be serviced — so pilots can schedule accordingly. Tony Goede, aerial manager with BASF, estimates that 70% of the aerial application market is still last-minute, though pilots do have a feel for the

volume of work that could hit their area.

Goede says the other biggest worry for retailers when hiring out for aerial work is trust — an issue that also emerged from our reader survey (see pgs. 6-7). "For years the ag pilot has simply been summoned in emergencies in Corn Belt geographies," Goede says. The retailer has had limited contact with him, which decreases the chance to build a trusting relationship. The solution is to find a good ag pilot who takes the time to build relationships and who runs his business honestly.

Return on investment typically is not high with either owned or contracted planes, Wilbur-Ellis' Koeman admits, but aerial application is definitely one way to differentiate a business from other retailers.



good condition — that it needs, as well as support staff such as a mechanic.

Also ask if an applicator attends plane calibration clinics each year, such as Operation S.A.F.E. (Self-Regulating Application & Flight Efficiency) fly-ins, offered by NAAA. The association actually publishes a list of attendees on its web site. State departments of agriculture can also provide pilot information.

Scott Schertz, owner of Schertz Aerial Service, Hudson, IL, listed some other good nuts-and-bolts issues to cover: Find out if the business carries all necessary liability insurance and workers' compensation. Check out its facilities, containment structures, safety measures, and inspection requirements. Make sure applicators have all licenses and certification. And ask about any network that the company might be a part of and about how it manages additional planes to help at peak work load times.







A specific service valued by Mike Carrell, branch manager of Ceres LLP at Wingate, IN, was the ability to provide asapplied maps. "When we first started using aerial, customers were watching planes from a mile away and swearing our contractors were spraying the wrong field — or not spraying at all," explains Carrell. An as-applied map stapled to the job invoice sent to the grower solves the problem.

Many of our contacts stressed the need to build a solid relationship with aerial applicators. Aerial companies with that positive bond and good communication deliver better service and can fulfill the demands of a retailer, especially when they need to forecast workload and bring in other pilots if needed, says BASF's Goede.

A major point made by all our industry contacts was the level of professionalism evidenced in the ag aerial industry today. Gone are the days of the wild-eyed cropdusters that many in the general public still cling to. The majority of applicators are highly skilled pilots and businessmen committed to their customers and communities.

Meeting Demand

PILOTS, dealers and industry experts expressed some difference of opinion on how the ag aerial industry stands for meeting retailers' current and future application demands. Are there enough pilots?

Tony Goede, aerial manager with BASF Corp., reported at presstime that he knew of pilots this season who were still looking for work. And he sees more operations that are reaching and teaching kids right out of high school or college than there were four or five years ago.

In fact, Steve Benoit, owner of Benoit Aerial Spraying, Kankakee, IL, recruited and is now training two local young men who have ag backgrounds — one has been with him for three years, the other, five years. (He's been flying for 42 years, while his other pilot on staff has worked the skies for 20.) He actually purchased a training plane to help instruct the newbies — no small investment.

But Kevin Brown of Bluestem Aerial Sprayers, Cushing, OK, is concerned the corn fungicide boom has created a shortage of pilots industrywide. He knows of many applicators who have bought new equipment and headed north to join the rush.

A number of industry initiatives have been developed to help. For instance, for the last three years the National Agriculture Aviation Association and BASF have teamed up to fund scholarships to bring new pilots into the profession.

Many possible younger recruits just aren't interested in the demands of ag aerial application, believes BASF's Goede. It's a seven-day-aweek job that runs from sun-up to sundown for two months during the summer, and "there's a growing number of younger kids who don't really want to put the work in," he says. On the other hand, they can get a whole year's salary in those two months.

BASF's Gary Fellows, tech service, fungicide and seed treatment manager, believes the industry still has the capacity for today's demand based on the number of pilots and planes he sees in service. But as corn acres increase, for instance, fleet problems may arise "not too far down the road." Historically, certain years have been tighter than others, he says, based on insect or disease problems in different geographies.

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