

FIFTY YEARS OF VEGETATION MANAGEMENT

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In September 1952, I joined the DuPont Co. They had just developed the Substituted Urea herbicides (Monuron & Diuron) and my primary responsibility, over the next 5 years, was to introduce them in cotton, sugar cane and non-crop markets in Louisiana, Arkansas, Mississippi and east Texas. At that time, the primary herbicides used in IWC were the phenoxy, ammonium sulfamate, sodium chlorate, the borates and metaborates, weed oils, sodium arsenate and tri-chloroacetic acid. The substituted triazines were introduced shortly thereafter.

As we all know, most of these "old" products posed serious liabilities. The phenoxy esters presented volatility and drift concerns, sodium chlorate was highly flammable, the arsenicals label carried skull and crossbones, the borates were applied at 2,000 to 4,000 lbs per acre, ammonium sulfamate was corrosive and required rates of 120 to 180 lbs per acre, and the weed oils were considered environmental pollutants. Conversely, monuron and diuron were much safer, highly effective herbicides and use rates ranged from 10 to 60 lbs per acre for bare ground weed control and 0.25 to 0.3 lbs per acre for weed control in cotton and 0.50 to 2 lbs per acre in sugar cane.

The introduction of these compounds was a real learning experience. In crops, we had results ranging from non-performance during dry periods to outstanding results after rainfall in sandy and clay loams, and phytotoxicity in deep, fine sands. The key factors affecting performance were soil type, availability of moisture and weed species. We learned the hard way about the K factor, adsorption, need for activation, photo breakdown and the need for the proper equipment, nozzles and calibration, etc.

In non-crop weed control, we had few successes. We learned that deep-rooted perennials such as Johnsongrass, bermuda, vasey and dallis grass required rates twice the initial label rates. "Telvar" was effective on most vines but diuron was ineffective. Few customers had the proper equipment so we had to "rig up" and calibrate the sprayers. In short, selling a job entailed setting out test plots to determine exact rates required, assist with the applications and follow-up.

One of the best lessons we learned was how to handle complaints. We decided early to investigate all complaints. In cotton, during our first year, over 40% of the farmers complained about crop injury or inadequate control. Every year thereafter, fewer and fewer complaints were received as we refined rates and application techniques. Within 5 years, over 70% of the cotton acreage in the Mississippi Delta was treated with "Karmex" as a pre-emergent herbicide. In non-crop weed control, with "Telvar", the higher rates were very effective but off-target washing and injury to roots of valuable plants required label

refinement and remedial considerations.

DuPont was very successful with the ureas and Geigy with the triazines in corn and IWC markets. This seemed to have encouraged many companies to invest heavily in developing new compounds during the late '50's. By the early '60's, several new herbicide families were introduced: "Treflan" and "Cotoran" for cotton and soybeans, and "Dowpon", "Hyvar", "Tordon", "Banvel", "Trysben", "Tandex" and "Spike" for IWC markets. These compounds quickly found niches in the marketplace and were widely used. They upgraded our ability to develop programs for customers. "Hyvar" was particularly effective on perennial grasses and was a superior residual for arid areas. Picloram's effectiveness on brush, perennial vines and noxious weeds was also very important.

During this period, universities were establishing weed science departments and curriculum that turned out graduates by the hundreds. They were well trained in the basics and significantly impacted the industry. Most were raised on farms and had been introduced to "hard work". Upon graduating, they went to work for herbicide manufacturers as researchers for universities, by utilities, railroads, state highway departments, county weed districts, etc. These professionals upgraded the industry to a technical level unmatched by any other ag related science. Researchers developed outstanding herbicides that had been thoroughly tested and were marketed and used with a high level of expertise.

During the '60's and early '70's, industry continued to develop compounds at a rapid rate. Compounds such as "Roundup", "Krenite", "Arsenal", "Velpar", "Garlon" and "Krovar" were followed by the sulfonyl ureas in the mid to late '70's. They continued to upgrade our flexibility in planning superior programs for customers. This was an era of great progress. Non-crop markets mushroomed. These compounds ("Oust", "Telvar", "Glean", "Escort") really impacted the market. They opened up sizeable selective weeding programs. Bermuda release in the south became a vast market. We were able to control tall growing broad-leaved plants as well as the tall, undesired grasses; to release short desired species, such as saltgrass, bermuda and bluegrass. Mowing costs were slashed by highway departments, railroads, utilities, drainage and plant sites. Highway departments mowing 8 to 10 times per year were able to reduce to 1 or 2 herbicide applications plus 1 or 2 mowings to realize savings of \$40 to \$100 per acre.

The introduction of the sulfonyl urea herbicides and other like compounds was an important development because of their low mammalian toxicity, broad activity on weeds and unbelievably low use rates (as low as 1/4 to 4 ounces per acre). The fantastic activity of these compounds necessitated they be kept on target. They helped to defend the use of herbicides with activists, the EPA, the public and elected officials.

By now, the vast array of products on the market sold by so many different companies created a very competitive business climate. It also made it possible to offer a program that would solve most of a customers needs. Bare ground, short term weed control, selective weeding, chemical trimming or control of brush, was possible for most any site regardless of its nature or plant species involved.

As marketers, we also got smarter. We analyzed customers needs and designed programs based on personal inspections of properties. We were able to "customize" jobs without injuring valuable plants, chemical trespass, or creating erosion problems. Our credibility was enhanced because we were using our own compounds as well as competitors to do the best job, the safest and at the least cost. This marketing technique resulted in significant market enhancement. This "service selling" is the key to success to this day.

There were a number of other developments that impacted this era:

1. During the '50's and '60's a number of states passes "Noxious Weed Laws" that delivered great dividends to the farmers by reducing weed control costs in crops and to all inhabitants. The county weed directors are professionals in weed identification, application techniques, and weed control technology, who perform a great service to their counties and state.

2. The introduction and marketing of a number of good surfactants, spray adjuvants, drift control agents, inverts, etc. also played an important role in that we were able to improve sprayability, reduce spray volumes, improve coverage, make applications safer and maximize performance at little additional cost.

3. The manufacturers of nozzles, valves, sprayers, hoses, agitators, injectors and computer equipment have also played an important role in this industry. Most railroad spray equipment has the capability to spray 2 or 3 different treatments simultaneously to rail beds, crossings, bridges, signs and switch stands while traveling 10 to 18 mph. The vast array of equipment available on the market facilitates getting the job done with safety to the public and the application personnel, regardless of the nature of the problem or the site.

4. We realized early on that it was impossible to call on every prospect. Also, many could ill afford to hire and train manpower, purchase the equipment and determine the right treatment. Custom application was the answer. In my territory, by 1956, I had five custom applicators actively involved in the business. They, in time, were well trained, had the proper equipment, were licensed and had insurance to protect against liabilities. Today, about 95% of the railroads are custom treated; utilities 80% to 90%; plant sites 90% to 95% and forestry 80% to 85%. The roadside markets and county weed districts are still largely self applied.

The environmental movement has had a significant impact on pesticide use. It really started with Rachel Carson's book "The Silent Spring". During the 50's, most of us grew up on farms and were delighted to replace "back-breaking" work (like cotton chopping, hoeing sugar cane, or pulling weeds in rice) with herbicides. But the image of the old herbicides (i.e. agent orange, arsenicals, chlorates) was hard to shed. Activists claimed that most pesticides were dangerous, creating questions in the minds of the public. Initially industry failed to properly defend pesticides. I remember DOW spending millions to defend phenoxy's, only to get a "bloody nose". In time, the activists overplayed their hand with misinformation and industry, with leadership and guidance from organizations such as NACA and RISE, helped turn things around. They are still a problem, but to a high degree, have shifted their attention to more enticing areas such as logging old forests, endangered species, CO's and local legislation that would make it more difficult to use pesticides.

Since the '80's, few products from new chemistry have been introduced. The cost of developing new products has mushroomed. The ureas cost DuPont in the range of \$3 million. Today's costs are in excess of \$50 million. Few business managers have the resources or the guts to gamble that kind of capital considering the "climate" in the marketplace. Efforts are being diverted to bio-technology and plant modification so that old chemistry can be utilized or modified to reach the substantial markets that exist.

Now a few brief comments:

1. Environmentalism is a moral issue. We have no alternative but to accept it. IRVM Programs are a must.
2. The Endocrine issue will require patience and, hopefully, science will disprove the claims.
3. Activists are here to stay and less of a factor, but we must be vigilant and defend our actions.
4. In IRVM programs, beautification and releasing desirable native species, should be important ingredients.
5. Safety is a major issue. Training programs are working.
6. The high cost to develop and re-register compounds is impacting the industry.
7. The edict to reduce pesticides 50% is resulting in an increase in the cost of vegetation management programs.

Marketing herbicides today is so different from my era of 1952 to 1985. Salesmen have, in many cases, 2 to 3 states as a territory. Their computer is their lifeline to colleagues and customers and travel budgets are a fraction of what they used to be. I entered the business when it was in it's infancy. We made great strides. It was fun - a dynamic business!